

**TM-271A (M2,M4)****TM-271A/E (K,M3,E)**

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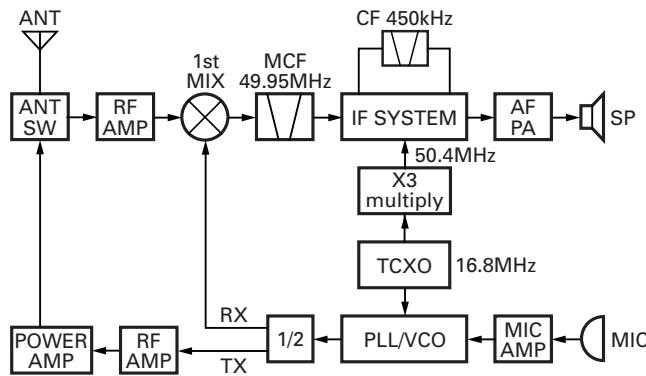
# TM-271A/271E

## CIRCUIT DESCRIPTION

## Frequency Configuration

The receiver utilizes double conversion. The first IF is 49.95MHz and the second IF is 450kHz. The first local oscillator signal is supplied from the PLL circuit.

The PLL circuit in the transmitter generates the necessary frequencies. Figure 1 shows the frequencies.



**Fig. 1 Frequency configuration**

## Receiver System

The receiver is double conversion superheterodyne. The frequency configuration is shown in Figure 1.

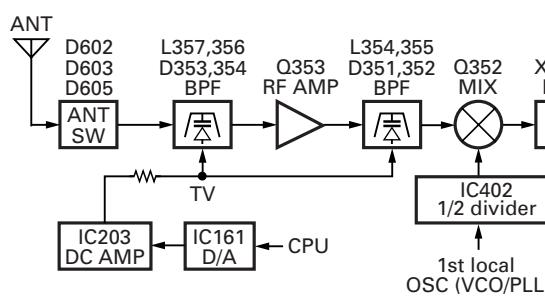
## ■ Front-end RF Amplifier

An incoming signal from the antenna is applied to an RF amplifier (Q353) after passing through a transmit/receive switch circuit (D603, D605 are off) and a band pass filter (L357, L356 and varactor diodes : D353, D354). After the signal is amplified (Q353), the signal is filtered through a band pass filter (L354, L355 and varactor diodes: D351, D352) to eliminate unwanted signals before it is passed to the first mixer.

The voltage of these diodes are controlled by tracking the CPU (IC101) center frequency of the band pass filter. (See Fig. 2.)

## ■ First Mixer

The signal from the RF amplifier is heterodyned with the first local oscillator signal from the PLL frequency synthesizer circuit at the first mixer (Q352) to create a 49.95MHz first intermediate frequency (1st IF) signal. The first IF signal is then fed through one pair of monolithic crystal filter (MCF : XF351) to further remove spurious signals.



**Fig. 2 Receiver system**

## ■ IF Amplifier

The first IF signal is amplified by Q351, and then goes to IC301 (FM processing IC). The signal is heterodyned again with a second local oscillator signal within IC301 to create a 450kHz second IF signal. The second IF signal is then fed through a 450kHz ceramic filter (Wide : CF301, Narrow : CF302) to further eliminate unwanted signals before it is amplified and FM detected in IC301.

Item	Rating
Nominal center frequency	49.95MHz
Pass bandwidth	±5.0kHz or more at 3dB
35dB stop bandwidth	±20.0kHz or less
Ripple	1.0dB or less
Insertion loss	5.0dB or less
Guaranteed attenuation	80dB or more at $f_0 \pm 1\text{MHz}$
Spurious	40dB or more
Terminal impedance	$350\Omega / 5.5\text{pF}$

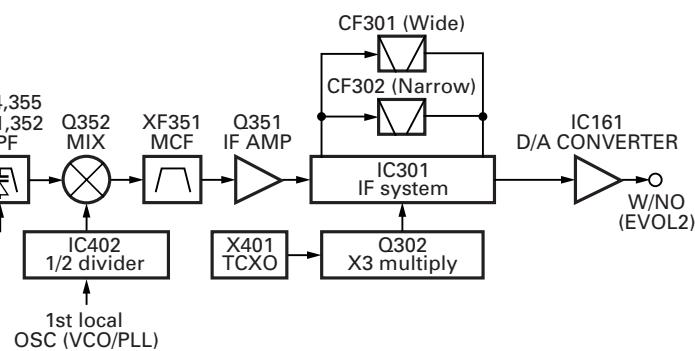
**Table 1 Crystal filter (L71-0620-05) : XF351**

Item	Rating
Nominal center frequency	450kHz
6dB bandwidth	$\pm 6.0\text{kHz}$ or more
50dB bandwidth	$\pm 12.5\text{kHz}$ or less
Ripple	2.0dB or less
Insertion loss	6.0dB or less
Guaranteed attenuation	35.0dB or more within $\text{fo} \pm 100\text{kHz}$
Terminal impedance	2.0k $\Omega$

**Table 2 Ceramic filter (L72-0993-05) : CF301**

Item	Rating
Nominal center frequency	450kHz
6dB bandwidth	$\pm 4.5\text{kHz}$ or more
50dB bandwidth	$\pm 10.0\text{kHz}$ or less
Ripple	2.0dB or less
Insertion loss	6.0dB or less
Guaranteed attenuation	60.0dB or more within $f_0 \pm 100\text{kHz}$
Terminal impedance	2.0k $\Omega$

**Table 3 Ceramic filter (L72-0999-05) : CF302**



# CIRCUIT DESCRIPTION

## ■ Wide/Narrow Switching Circuit

The Wide port (pin 65) and Narrow port (pin 64) of the CPU is used to switch between ceramic filters. When the Wide port is high, the ceramic filter SW diodes (D303, D302) cause CF301 to turn on to receive a Wide signal.

When the Narrow port is high, the ceramic filter SW diodes (D303, D302) cause CF302 to turn on to receive a Narrow signal. (See Fig. 3.)

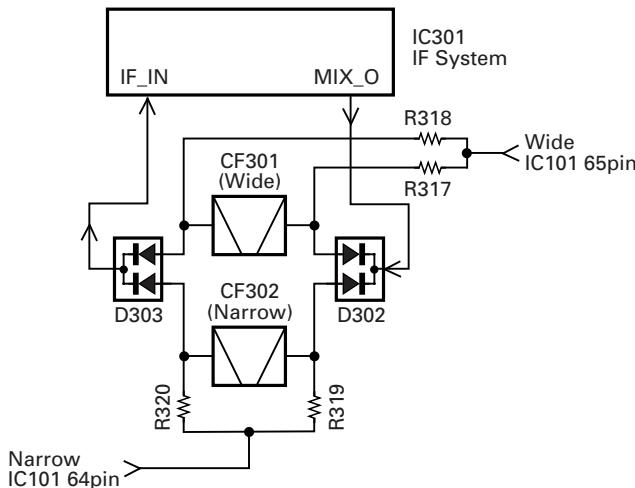


Fig. 3 Wide/Narrow switching circuit

## ■ AF Signal System

The detection signal from IF IC (IC301) goes to D/A converter (IC161) to adjust the gain and is output to AF filter (IC251) for characterizing the signal. The AF signal output from IC251 and the DTMF signal, BEEP signal are summed and the resulting signal goes to the D/A converter (IC161). The AFO output level is adjusted by the D/A converter. The signal output from the D/A converter is input to the audio power amplifier (IC252). The AF signal from IC252 switches between the internal speaker and speaker jack (J1) output. (See Fig. 4.)

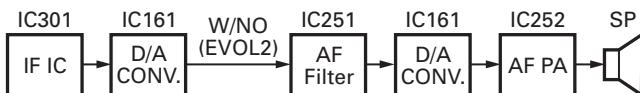


Fig. 4 AF signal system

## ■ Squelch Circuit

The detection output from the FM IF IC (IC301) passes through a noise amplifier (Q301) to detect noise. A voltage is applied to the CPU (IC101). The CPU controls squelch according to the voltage (SQIN) level. The signal from the RSSI pin of IC301 is used for S-meter. The electric field strength of the receive signal can be known before the SQIN voltage is input to the CPU, and the scan stop speed is improved.

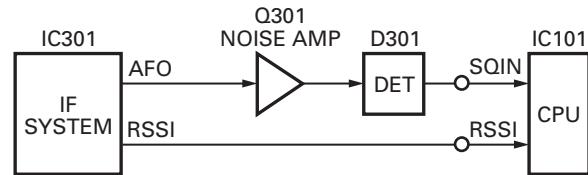


Fig. 5 Squelch circuit

## PLL Frequency Synthesizer

The PLL circuit generates the first local oscillator signal for reception and the RF signal for transmission.

## ■ PLL

The frequency step of the PLL circuit is 5 or 6.25kHz. A 16.8MHz reference oscillator signal is divided at IC401 by a fixed counter to produce the 5 or 6.25kHz reference frequency. The voltage controlled oscillator (VCO) output signal is buffer amplified by Q410, then divided in IC401 by a dual-module programmable counter. The divided signal is compared in phase with the 5 or 6.25kHz reference signal in the phase comparator in IC401. The output signal from the phase comparator is filtered through a low-pass filter and passed to the VCO to control the oscillator frequency. (See Fig. 6.)

## ■ VCO

The operating frequency is generated by Q406 in transmit mode and Q405 in receive mode. The oscillator frequency is controlled by applying the VCO control voltage, obtained from the phase comparator, to the varactor diodes (D405 and D406 in transmit mode and D403 and D404 in receive mode). The TX/RX pin is set high in receive mode causing Q408 and Q407 to turn Q406 off, and turn Q405 on. The TX/RX pin is set low in transmit mode. The outputs from Q405 and Q406 are amplified by Q410 and sent to the RF amplifiers. (See Fig. 6.)

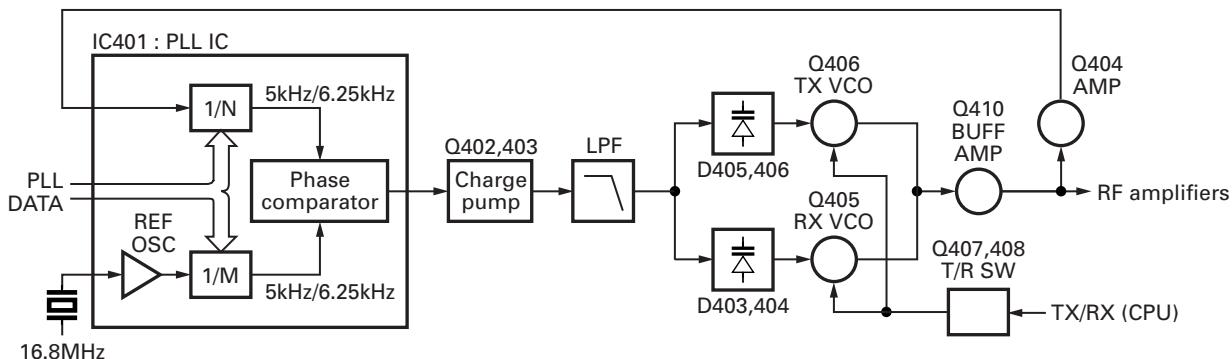


Fig. 6 PLL circuit

## CIRCUIT DESCRIPTION

## ■ Unlock Circuit

During reception, the 8RC signal goes high, the 8TC signal goes low, and Q34 turns on. Q33 turns on and a voltage is applied to 8R. During transmission, the 8RC signal goes low, the 8TC signal goes high and Q36 turns on. Q35 turns on and a voltage is applied to 8T.

The CPU monitors the PLL (IC401) LD signal directly. When the PLL is unlocked during transmission, the PLL LD signal goes low. The CPU detects this signal and makes the 8TC signal low. When the 8TC signal goes low, no voltage is applied to 8T, and no signal is transmitted. (See Fig. 7.)

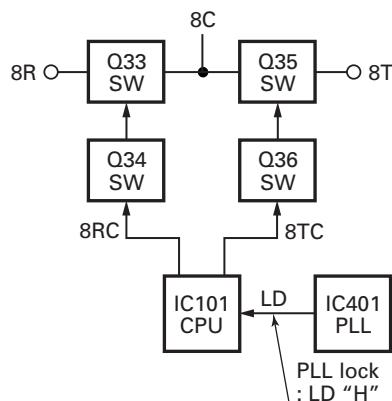


Fig. 7 Unlock circuit

## Transmitter System

## ■ Outline

The transmitter circuit produces and amplifies the desired frequency directly. It FM-modulates the carrier signal by means of a varicap diode.

## ■ Power Amplifier Circuit

The transmit output signal from the VCO passes through the transmission/reception selection diode (D409) and amplified by Q501, Q502 and Q503. The amplified signal goes to the final amplifier (Q504) through a low-pass filter. The low-pass filter removes unwanted high-frequency harmonic components, and the resulting signal is transmitted through the antenna terminal. (See Fig. 8.)

## ■ APC Circuit

The automatic transmission power control (APC) circuit detects part of a final amplifier output with a diode (D606, D607) and applies a voltage to IC501. IC501 compares the APC control voltage (PC) generated by the D/A converter (IC161) and DC amplifier (IC203) with the detection output voltage. IC501 generates the voltage to control Q503 and Q504 and stabilizes transmission output.

The APC circuit is configured to protect over current of Q503 and Q504 due to fluctuations of the load at the antenna end and to stabilize transmission output at voltage and temperature variations. (See Fig. 9.)

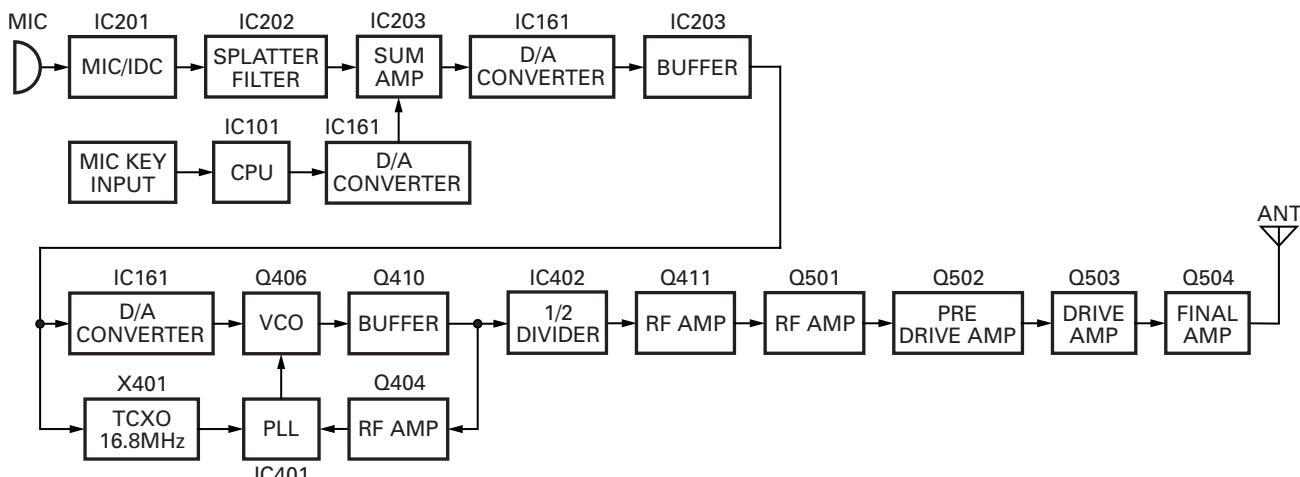


Fig. 8 Transmitter system

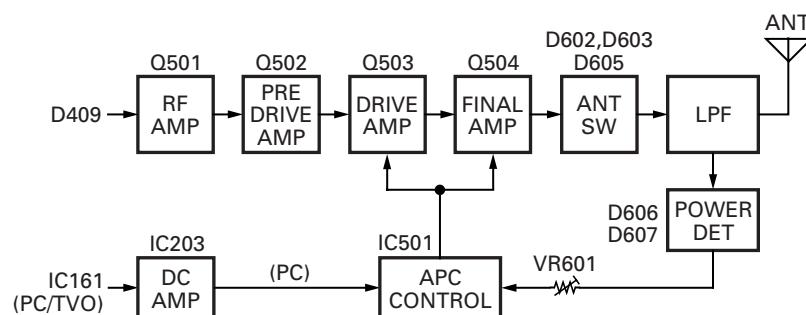


Fig. 9 APC circuit

# CIRCUIT DESCRIPTION

## Control Circuit

The CPU carries out the following tasks (See Fig. 10.):

- 1) Controls the WIDE, NARROW, TX/RX outputs.
- 2) Adjusts the AF signal level of the AF filter (IC251) and turns the filter select compounder on or off.
- 3) Controls the display unit.
- 4) Controls the PLL (IC401).
- 5) Controls the D/A converter (IC161) and adjusts the volume, modulation and transmission power.

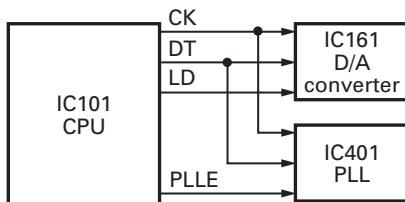


Fig. 10 Control circuit

## Memory Circuit

The transceiver has an 64k-bit EEPROM (IC66). The EEPROM contains adjustment data. The CPU (IC101) controls the EEPROM through three serial data lines. (See Fig. 11.)

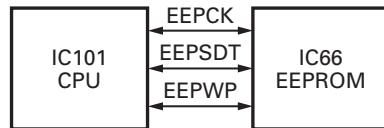


Fig. 11 Memory circuit

## Display Circuit

The CPU (IC101) controls the display LCD and LEDs. When power is on, the LCD driver will use the BL line to control the LCD illumination and key backlight LEDs.

The brightness function is controlled by the switch Q12. The LCD driver (IC3) and CPU (IC101) communicate through the CE, CL, DI, DO lines. (See Fig. 12.)

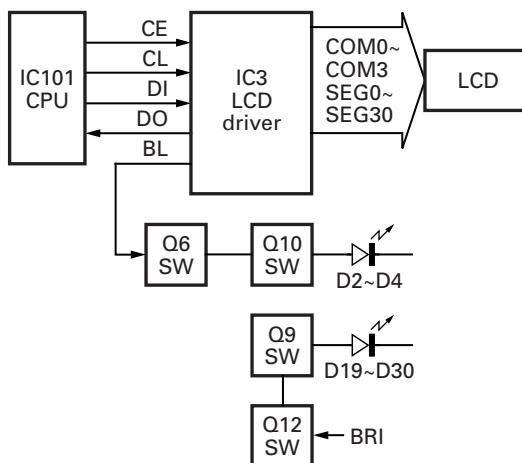


Fig. 12 Display circuit

## ■ Key Matrix Circuit

The TM-271 front panel has function keys. Each of them is connected to a cross point of a matrix of the KI1 to KI3 and KS1 to KS2 ports of the LCD driver.

The LCD driver monitors the status of the KI1 to KI3 and KS1 to KS2 ports. If the state of one of the ports changes, the LCD driver assumes that the key at the matrix point corresponding to that port has been pressed.

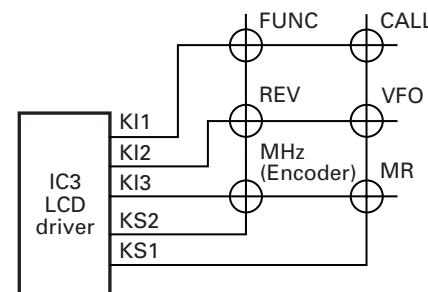


Fig. 13 Key matrix circuit

## ■ Encode

The DCS and CTCSS signals are output from QT/DQT of the CPU (IC101) and summed with the external pin DI line by the summing amplifier (IC203) and the resulting signal goes to the D/A converter (IC161). The DTMF signal is output from DTMF pin of the CPU and summed with a MIC signal by the summing amplifier (IC203), and the resulting signal goes to the D/A converter (IC161).

The D/A converter (IC161) adjusts the MOD level and the balance between the MOD and CTCSS/DCS levels. Part of a CTCSS/DCS signal is summed with MOD and the resulting signal goes to the VCOMOD pin of the VCO. This signal is applied to a varicap diode in the VCO for direct FM modulation.

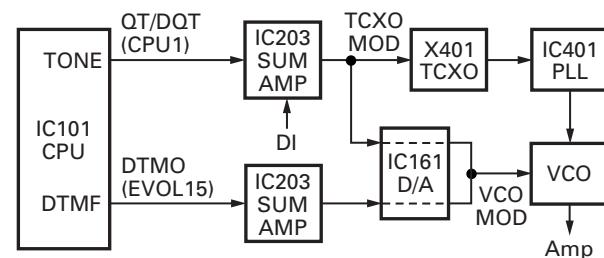


Fig. 14 Encoder

## CIRCUIT DESCRIPTION

## ■ Decode

## • CTCSS/DCS

The signal (W/NO (EVOL2)) goes to DTMF IN (pin 95) of CPU (IC101). The CTCSS/DCS signal will pass through the low-pass filters in the CPU (IC101) and be decoded within the CPU (IC101). The DTMF signal will be decoded within the CPU (IC101).



Fig. 15 Decode

## ■ D/A Converter

The D/A converter (IC161) is used to adjust MO modulation, AF volume, TV voltage, FC reference voltage, and PC POWER CONTROL voltage level.

Adjustment values are sent from the CPU as serial data. The D/A converter has a resolution of 256 and the following relationship is valid:

$$\text{D/A output} = (\text{Vin} - \text{VDeref}) / 256 \times n + \text{VDeref}$$

Vin: Analog input

VDeref: D/A reference voltage

n: Serial data value from the microprocessor (CPU)

## Power Supply Circuit

When the power switch on the display unit is pressed, the power port on the display unit which is connected port 17 (POWER), goes low, then port 82 (SBC) goes high, Q32 turns on, SB SW (Q31) turns on and power (SB) is supplied to the radio.

When the DC power supplied to the radio, the voltage regulator IC (IC33) supply into the CPU VDD and reset voltage detect IC (IC34). IC34 will generate signal (RESET) in to the reset terminal on the CPU (IC101) to carry out a power ON reset. If DC power is less than about 9.5V, the radio is unable to power on.

When the DC power voltage deceases from normal voltage, the INT voltage detector IC (IC35) will set to high on CPU port 18 (INT) if B line will became less than about 9.5V. Then CPU send to EEPROM (IC66) the backup data and go into STOP mode.

This circuit has an overvoltage protection circuit. If a DC voltage of 18V or higher is applied to the base of Q61, this voltage turns Q61 on and will set to high on CPU port 18 (INT). Then CPU send to EEPROM (IC66) the backup data and go into stop mode. (See Fig. 16.)

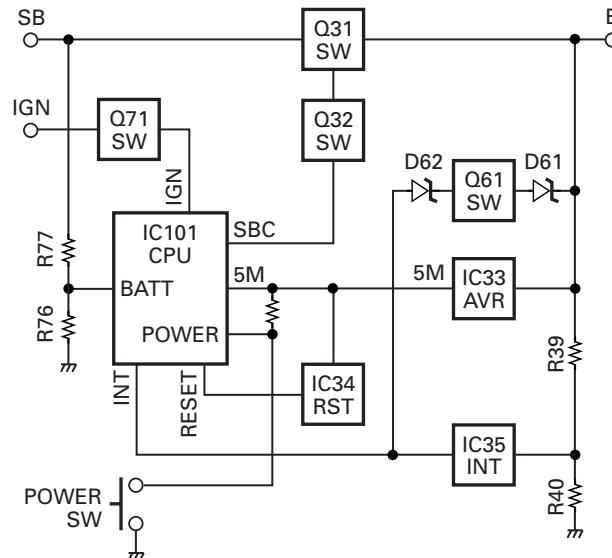


Fig. 16 Power supply circuit

## Data Terminal and Peripheral Circuits

CN2 (data terminal) is the data communications terminal on the TX/RX PCB. It handles transmission control, data input/output, and squelch signals.

There are two data communications modes : 9600bps mode and 1200bps mode. Unlike with 1200bps AFSK, with this type of high-speed modulation, frequency modulation is carried out after the digital base band signals (rectangular wave) are passed through a band limiting filter. For 9600bps GMSK for example, compared to 4800Hz signals (nearly sine wave signals passed through a filter), these signals have a hissing sound like digital modulation when listened to by ear. Different types of modulation, such as GMSK is distinguished by the type of band limiting filter.

Pin No.	Pin Name	Specification		
1	PKD	bps switching	1200bps	9600bps
		Modulation input	400mVp-p	4Vp-p
		Frequency shift	3±0.5kHz	2.2±0.5kHz
4	PR9	Output level 500mVp-p/10kΩ	Always output during reception	
5	PR1	Output level 500mVp-p/10kΩ	Not output when squelch off	

Table 4 Data terminal input/output level

# CIRCUIT DESCRIPTION

## ■ Transmission Signals

Transmission modulation signals enter from PKD of the data terminal (CN2). The path to the modulation depends on whether communications are 1200bps or 9600bps mode.

For 1200bps mode, the transmission modulation signals from single analog switch (IC204) pass through MIC amplifier (IC201,202) and summing amplifier (IC203), and go to VCO (X401) through D/A converter (IC161).

For 9600bps mode, the transmission modulation signals from single analog switch (IC205) pass through summing amplifier (IC303), go to TCXO (X401) and VCO through D/A converter (IC161). (See Fig. 17.)

## ■ Reception Signals

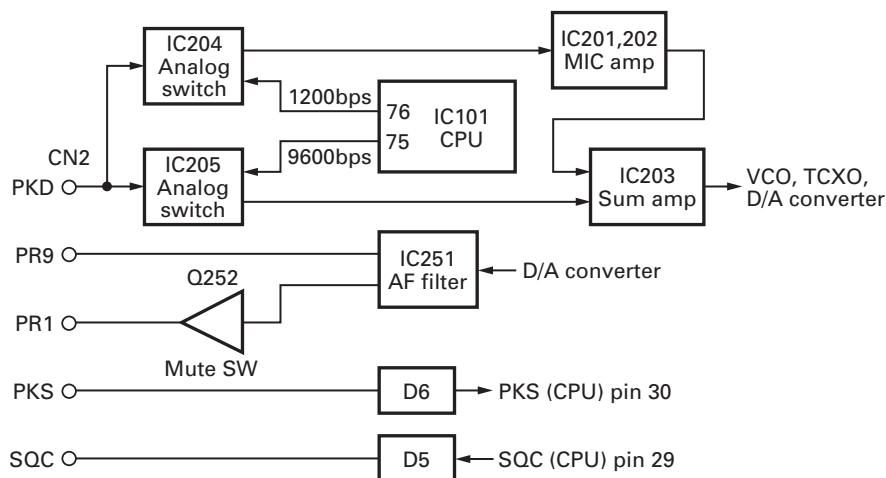
PR9 is the 9600bps data communications reception output. It outputs the FM detection circuit output through an AF filter (IC251). These signals are always output whether the squelch is open or closed.

PR1 is the 1200bps data communications reception output. It outputs the FM detection circuit output through an AF filter (IC251). Output is controlled with the mute switch (Q252) according to whether squelch is open or closed. (See Fig. 17.)

## ■ Squelch Signal Output Circuit

The squelch circuits is input to the TNC to prevents conflicts from occurring between simultaneous receive mode and transmit mode traffic during packet communications (only during 1200bps). The signal is output from pin 29 of IC101 to the data terminal. The logic is as shown in the table below.

SQC terminal output	L : SQ CLOSE
CN2	H : SQ BUSY



Fog. 17 Data terminal and peripheral circuits

## SEMICONDUCTOR DATA

## Microprocessor : 30622MAA-B85GP (TX-RX Unit IC101)

## ■ Terminal Function

Pin No.	Name	I/O	Function
1	TONE	O	CTCSS/DCS/Clone output
2	DTMF	O	DTMF/BEEP/1750Hz output
3	PLLE	O	PLL IC chip select
4,5	NC	I	
6	GND	-	GND.
7	CNVSS	-	
8	EVLLD	O	
9	BSHIFT	O	Beat shift
10	RESET	-	Reset
11	XOUT	-	X'tal (8MHz)
12	VSS	-	GND
13	XIN	-	X'tal (8MHz)
14	VCC	-	+5V
15	NMI	-	(Input only)
16	NC	I	
17	POWER	I	Power key input
18	INT	I	$\mu$ com stop
19	NC	I	
20	TX/RX	O	TX/RX
21	UL	I	PLL unlock detect
22,23	NC	I	
24	EEPSDT	I/O	EEPROM data
25	EEPCK	O	EEPROM clock
26	EEPWP	O	EEPROM write protect
27,28	NC	I	(Nch open drain)
29	SQC	O	Squelch signal output for TNC (TxD for flash)
30	PKS	I	PTT input for TNC (RxD for flash)
31	CLKFLS	I	(GND)
32	BSYFLS	O	(Vcc)
33	TXD	O	To PC
34	RXD	I	From PC
35	PTT	I	PTT input
36~38	NC	I	
39	EMPFLS	I/O	(GND)
40~43	NC	I	
44	CEFLS	I/O	(Vcc)
45~49	NC	I	
50	AFM	O	AF mute
51	SPM	O	Speaker mute
52	AMPSW	O	AF AMP switch

Pin No.	Name	I/O	Function
53	DT	O	Common data
54	CK	O	Common clock
55	NC	I	
56	DST1	I	Destination 1
57~59	DST2~DST4	I	Destination 2~4
60	VCC	-	+5V
61	NC	I	
62	VSS	-	GND
63	ADJ	I	For adjustment mode
64	NARROW	O	Wide/Narrow 2
65	WIDE	O	Wide/Narrow
66,67	NC	I	
68	LCDCL	O	Clock for LCD
69	LCDCE	O	Chip enable for LCD
70	LCDDO	O	Output data to LCD
71	LCDDI	I	Input data from LCD
72	NC	I	
73	ENCB	I	Encoder input B
74	ENCA	I	Encoder input A
75	TNC9600	O	TNC speed H : 9600, L : 1200
76	TNC1200	O	TNC speed L : 9600, H : 1200
77	MICMT	O	MIC mute
78	NC	I	NC
79	8RC	O	8R control
80	8TC	O	8T control
81	NC	I	
82	SBC	O	Battery switch
83~85	NC	I	
86	CM	I/O	MIC key check
87		I	For AMR DTMF keypad MIC
88		I	For AMR DTMF keypad MIC
89	VOL	I	Volume encoder
90	TEMP2	I	Temperature 2
91	TEMP1	I	Temperature 1
92	RSSI	I	RSSI input
93	SQIN	I	Squelch input
94	AVSS	-	GND
95	DTMF IN	I	CTCSS/DCS/Clone/1050Hz input
96	VREF	-	+5V
97	AVCC	-	+5V
98~100	NC	I	

## COMPONENTS DESCRIPTION

## Display Unit (X54-3450-10)

Ref. No.	Parts name	Description
IC3	IC	LCD controller
Q6	Transistor	DC switch
Q9	Transistor	LCD backlit switch
Q10	Transistor	Key backlit switch
Q12	Transistor	Brightness function switch
D2~4	LED	Key backlit
D19~30	LED	LCD backlit
D31	Diode	Reverse connection protection

## TX-RX Unit (X57-685X-XX)

Ref. No.	Parts name	Description
IC31	IC	Voltage regulator (8C)
IC32	IC	Voltage regulator (5C)
IC33	IC	Voltage regulator (5M)
IC34	IC	Voltage detector (reset)
IC35	IC	Voltage detector (int)
IC66	IC	EEPROM
IC101	IC	CPU
IC161	IC	Digital potentiometer
IC201	IC	MIC amplifier / IDC
IC202	IC	MIC amplifier / Splatter filter
IC203	IC	Buffer amplifier / SUM amplifier / DC amplifier / 1/2 Vcc
IC204,205	IC	Single analog switch
IC251	IC	Audio filter
IC252	IC	Audio amplifier
IC301	IC	FM demodulation
IC401	IC	PLL synthesizer
IC402	IC	Divider (Hetero)
IC501	IC	APC controller
Q31,32	Transistor	DC switch (SB) / Active when power is on
Q33,34	Transistor	DC switch (8R) / Active while RX
Q35,36	Transistor	DC switch (8T) / Active while TX
Q61	Transistor	Over voltage detection / Active when PS voltage is more than 18V
Q86,87	Transistor	Beat shift / Active while beat shift is on
Q201	Transistor	AGC / MIC mute
Q251	Transistor	Buffer amplifier / RX audio
Q252,253	FET	AF mute / Active while AFM is H
Q254	Digital transistor	AF mute / Active while SPM is H
Q255	Transistor	AF mute / Active while AMPSW is H
Q301	Transistor	Noise amplifier / SQL amplifier

Ref. No.	Parts name	Description
Q302	Transistor	Buffer amplifier / 16.8MHz 3rd over tone
Q351	Transistor	IF amplifier
Q352	FET	Mixer
Q353	FET	RF amplifier / LNA
Q354	Transistor	PC/TV switch
Q402,403	Transistor	Charge pump
Q404	Transistor	RF amplifier / PLL F in
Q405	FET	RX VCO
Q406	FET	TX VCO
Q407	FET	T/R switch
Q408	Transistor	T/R switch
Q410	Transistor	Buffer amplifier / Output of VCO
Q411	Transistor	RF amplifier / Output of VCO
Q440	Transistor	Lipple filter
Q501,502	Transistor	RF amplifier / Drive stage
Q503	FET	RF amplifier / Drive amplifier
Q504	FET	RF amplifier / Final amplifier
D1	Diode	Surge absorption / CM
D2	Diode	Surge absorption / MIC key
D3	Diode	Surge absorption / RXD
D4	Diode	Surge absorption / PTT
D5	Diode	Surge absorption / SQC
D6	Diode	Surge absorption / PKS
D31	Diode	Reverse connection protection
D32	Poly switch	Current protection
D61,62	Diode	Over voltage detection
D201	Diode	OR gate / MIC mute, AGC
D202	Diode	AGC
D251	Diode	Limiter
D301	Diode	Detection
D302,303	Diode	IF switch (Wide/Narrow)
D351~354	Varicap	RF BPF tuning
D401	Diode	Ripple filter
D402	Diode	Voltage dropped
D403,404	Varicap	RX VCO
D405,406	Varicap	TX VCO
D407	Varicap	Modulation
D408	Diode	Lipple filter
D409	Diode	RF switch (TX/RX)
D501,502	Diode	Temperature compensation
D503	Diode	Voltage protection
D602,603	Diode	ANT switch
D605	Diode	ANT switch
D606,607	Diode	APC voltage detect
D608	Diode	Temperature compensation

## PARTS LIST

\* New Parts.  $\Delta$  indicates safety critical components.  
 Parts without **Parts No.** are not supplied.  
 Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.  
 Teile ohne **Parts No.** werden nicht geliefert.

**L** : Scandinavia    **K** : USA    **P** : Canada  
**Y** : PX (Far East, Hawaii)    **T** : England    **E** : Europe  
**Y** : AAFES (Europe)    **X** : Australia    **M** : Other Areas

## TM-271A/E

## DISPLAY UNIT (X54-3450-10)

Ref. No.	Address	New parts	Parts No.	Description	Desti- nation	
<b>TM-271A/E</b>						
1	1B	*	A01-2193-01	CABINET		
2	3B		A10-4048-21	CHASSIS		
3	3A	*	A62-1088-03	PANEL ASSY		
5	1D	*	B62-1738-10	INSTRUCTION MANUAL	K,M2,M3	
5	1D	*	B62-1738-10	INSTRUCTION MANUAL	E	
5	1D	*	B62-1739-10	INSTRUCTION MANUAL	K,M2,E	
5	1D	*	B62-1745-10	INSTRUCTION MANUAL	M3	
5	1D	*	B62-1746-10	INSTRUCTION MANUAL	M4	
5	1D	*	B62-1784-10	INSTRUCTION MANUAL	E	
6	3B	*	B72-2171-04	MODEL NAME PLATE	K	
6	3B	*	B72-2172-04	MODEL NAME PLATE	M2	
6	3B	*	B72-2173-04	MODEL NAME PLATE	M3	
6	3B	*	B72-2174-04	MODEL NAME PLATE	M4	
6	3B	*	B72-2175-04	MODEL NAME PLATE	E	
8	3B	E04-0167-05	RF COAXIAL PECEPTACLE (M)		K,M2,M3	
8	3B	E04-0167-05	RF COAXIAL PECEPTACLE (M)		M4	
9	3B	E04-0170-05	RF COAXIAL RECEPTACLE (N)		E	
10	3C	E30-2111-15	DC CORD	ACCESSORY	K,M2,M3	
10	3C	E30-2111-15	DC CORD	ACCESSORY	M4	
11	3C	*	E30-3452-05	DC CORD	ACCESSORY	E
12	2B	*	E30-7501-05	TNC CABLE	E	
13	2B	*	E30-7512-05	DC CORD (RADIO)	K,M2,M3	
13	2B	*	E30-7512-05	DC CORD (RADIO)	M4	
14	2B	*	E30-7513-05	DC CORD (RADIO)	E	
15	3A	E37-1082-05	SPEAKER WIRE			
16	2A	*	E37-1097-05	FLAT CABLE		
17	3C	*	F51-0024-05	FUSE (BLADE) (15A/32V)	E	
18	2B	F10-2449-01	SHIELDING COVER			
20	3C	F51-0017-05	FUSE (6*30) (15A)		K,M2,M3	
20	3C	F51-0017-05	FUSE (6*30) (15A)		M4	
23	2B	G02-0894-04	EARTH SPRING (FINAL FET)			
24	2A	*	G10-1324-04	FIBROUS SHEET (DISPLAY UNIT)		
25	3B	G11-4127-14	RUBBER SHEET (CHASSIS)			
26	2B	G11-4240-04	RUBBER SHEET (DRIVE FET)			
27	3B	G13-1468-04	CUSHION (CHASSIS)		K,M2,M3	
27	3B	G13-1468-04	CUSHION (CHASSIS)		M4	
28	3A	G53-1525-03	PACKING (PANEL)			
29	2B	G53-1542-03	PACKING (PHONE JACK)			
30	1B	G53-1544-01	PACKING (SHIELDING COVER)			
31	1A	G53-1548-02	GASKET			
33	2C,1D	H12-3112-05	PACKING FIXTURE			
34	3D	H13-1190-02	CARTON BOARD			
36	1D	H25-2341-04	PROTECTION BAG			
37	2D	*	H52-1995-12	ITEM CARTON CASE	K,M2	
37	2D	*	H52-2027-02	ITEM CARTON CASE	M3	
37	2D	*	H52-2028-02	ITEM CARTON CASE	M4	
37	2D	*	H52-2029-12	ITEM CARTON CASE	E	
39	3C	J19-1584-05	MIC HOLDER	ACCESSORY		
40	3D	J29-0662-03	BRACKET	ACCESSORY		
42	3A	*	K29-9291-01	KEY TOP		
43	3A	*	K29-9292-03	KNOB (VOLUME)		

Ref. No.	Address	New parts	Parts No.	Description	Desti- nation
44	3A	*	K29-9293-03	KNOB (ENCODER)	
A	2B		N67-2608-46	PAN HEAD SEMS SCREW	
B	2A		N80-2010-45	PAN HEAD TAPIT SCREW	
C	2B,3B		N87-2606-46	BRAZIER HEAD TAPIT SCREW	
D	1B,2B		N87-2614-46	BRAZIER HEAD TAPIT SCREW	
46	3D		N99-0395-05	SCREW SET	ACCESSORY
48	3A		T07-0739-05	SPEAKER	
49	2C		T91-0624-05	MICROPHONE	ACCESSORY
50	2C	*	T91-0641-05	MICROPHONE	ACCESSORY
<b>DISPLAY UNIT (X54-3450-10)</b>					
101	2A	*	B11-1809-03	ILLUMINATION GUIDE (LCD)	
102	2A	*	B38-0885-05	LCD	
D2-4			B30-2205-05	LED (YG)	
D19-30			B30-2205-05	LED (YG)	
C4			CC73GCH1H101J	CHIP C	100PF J
C15,16			CC73GCH1H101J	CHIP C	100PF J
C19			CK73GB1H681K	CHIP C	680PF K
C22			CK73GB1H102K	CHIP C	1000PF K
C24			CK73GB1C104K	CHIP C	0.10UF K
C25			CK73GB1H102K	CHIP C	1000PF K
C27			CK73GB1H102K	CHIP C	1000PF K
C30			CK73GB1C104K	CHIP C	0.10UF K
C31-33			CK73GB1H102K	CHIP C	1000PF K
C34,35			CK73GB1H472K	CHIP C	4700PF K
C36			CK73GB0J105K	CHIP C	1.0UF K
C38			CK73GB1H471K	CHIP C	470PF K
C39,40			CK73GB1C104K	CHIP C	0.10UF K
103	2A	*	E29-1201-04	INTER CONNECTOR (LCD)	
CN1			E40-6005-05	FLAT CABLE CONNECTOR	
J1			E08-0877-05	MODULAR JACK	
104	2A	*	J21-8463-03	HARDWARE FIXTURE (LCD)	
L1			L92-0138-05	FERRITE CHIP	
CP1			R90-0724-05	MULTI-COMP	1K X4
R8			RK73GB1J102J	CHIP R	1.0K J 1/16W
R10			RK73GB1J122J	CHIP R	1.2K J 1/16W
R21-23			RK73GB1J103J	CHIP R	10K J 1/16W
R25			RK73GB1J563J	CHIP R	56K J 1/16W
R26			RK73GB1J392J	CHIP R	3.9K J 1/16W
R41			RK73FB2A560J	CHIP R	56 J 1/10W
R42			RK73GB1J272J	CHIP R	2.7K J 1/16W
R43			RK73GB1J821J	CHIP R	820 J 1/16W
R44			RK73GB1J183J	CHIP R	18K J 1/16W
R45			RK73GB1J333J	CHIP R	33K J 1/16W
R46			RK73GB1J101J	CHIP R	100 J 1/16W
R47,48			RK73GB1J473J	CHIP R	47K J 1/16W
R49,50			RK73FB2A560J	CHIP R	56 J 1/10W
R51-53			R92-1252-05	CHIP R	0 OHM J 1/16W
R54			RK73FB2A560J	CHIP R	56 J 1/10W

**K,M2,M3,M4 : TM-271A****E : TM-271E**

## PARTS LIST

DISPLAY UNIT (X54-3450-10)  
TX-RX UNIT (X57-685X-XX)

Ref. No.	Address	New parts	Parts No.	Description			Desti-nation	Ref. No.	Address	New parts	Parts No.	Description			Desti-nation													
R55		*	R92-1252-05	CHIP R	0 OHM	J	1/16W				C206	CK73GB1H681K	CHIP C	680PF	K	E												
VR1		*	R31-0646-05	VARIABLE RESISTOR						C207	CK73GB1C223K	CHIP C	0.022UF	K	K,M2,M3													
D31		*	1SS355	DIODE						C207	CK73GB1C223K	CHIP C	0.022UF	K	M4													
IC3		*	LC75854W	MOs IC							C207	CK73GB1C393K	CHIP C	0.039UF	K													
IC3		*	PT6554LQ	MOS IC							C208	CK73GB1H103K	CHIP C	0.010UF	K	E												
Q6			KRC102S	DIGITAL TRANSISTOR																								
Q9			2SB1132(Q,R)	TRANSISTOR																								
Q10		*	KRA225S	DIGITAL TRANSISTOR																								
Q12		*	UMG3N	TRANSISTOR																								
S1		*	W02-3665-05	ENCODER																								
<b>TX-RX UNIT (X57-685X-XX)</b>																												
<b>0-10 : K 0-21 : M2 0-22 : M3 0-23 : M4 2-71 : E</b>																												
C10			CK73GB1H102K	CHIP C	1000PF	K							C222	CK73GB1C104K	CHIP C	0.10UF	K											
C13-20			CK73GB1H471K	CHIP C	470PF	K							C225	C92-0004-05	CHIP-TAN	1.0UF	16WV											
C28			CK73GB1H221K	CHIP C	220PF	K							C226	CK73GB1H472K	CHIP C	4700PF	K											
C29			CK73GB1H471K	CHIP C	470PF	K							C227	CK73GB1E103K	CHIP C	0.010UF	K											
C30			CK73GB1H102K	CHIP C	1000PF	K							C228	C92-0560-05	CHIP-TAN	10UF	6.3WV											
C33		*	CK73GB1H102K	CHIP C	1000PF	K							C230	CK73GB1C104K	CHIP C	0.10UF	K											
C34		*	CE04EQ1E331M	ELECTRO	330UF	25WV							C231,232	CK73GB1H102K	CHIP C	1000PF	K											
C35-38		*	CK73GB1H102K	CHIP C	1000PF	K							C233	C92-0507-05	CHIP-TAN	4.7UF	6.3WV											
C39,40			CK73GB1C104K	CHIP C	0.10UF	K							C235	CK73GB1A105K	CHIP C	1.0UF	K											
C41			C92-0795-05	CHIP-TAN	22UF	10WV							C249	C92-0507-05	CHIP-TAN	4.7UF	6.3WV											
C42			CK73GB1H103K	CHIP C	0.010UF	K							C250	CK73GB1C104K	CHIP C	0.10UF	K											
C43-45			C92-0795-05	CHIP-TAN	22UF	10WV							C251	C92-0714-05	CHIP-TAN	4.7UF	6.3WV											
C49,50			CK73GB1H103K	CHIP C	0.010UF	K							C252	CC73GCH1H390J	CHIP C	39PF	J											
C51			C92-0589-05	CHIP-TAN	47UF	6.3WV							C253,254	CK73GB1A224K	CHIP C	0.22UF	K											
C52,53			CK73GB1H102K	CHIP C	1000PF	K							C255	CK73GB1H822K	CHIP C	8200PF	K											
C54,55			CK73GB1C104K	CHIP C	0.10UF	K							C256	CK73GB1E183K	CHIP C	0.018UF	K											
C56			CK73GB1H102K	CHIP C	1000PF	K							C257	CK73GB1C393K	CHIP C	0.039UF	K											
C61			CK73GB1H102K	CHIP C	1000PF	K							C258-261	CK73GB1H103J	CHIP C	0.010UF	J											
C66			CK73GB1H102K	CHIP C	1000PF	K							C262	CK73GB1H102K	CHIP C	1000PF	K											
C82			CK73GB1H102K	CHIP C	1000PF	K							C263,264	CK73GB1C333K	CHIP C	0.033UF	K											
C83			CK73GB1C104K	CHIP C	0.10UF	K							C265	CK73GB1C104K	CHIP C	0.10UF	K											
C87			CC73GCH1H030C	CHIP C	3.0PF	C							C266	CK73GB1A105K	CHIP C	1.0UF	K											
C88,89			CC73GCH1H040C	CHIP C	4.0PF	C							C267	CK73GB1A474K	CHIP C	0.47UF	K											
C90			CC73GCH1H030C	CHIP C	3.0PF	C							C268	CK73GB1A105K	CHIP C	1.0UF	K											
C97,98			CK73GB1H102K	CHIP C	1000PF	K							C270	C92-0507-05	CHIP-TAN	4.7UF	6.3WV											
C101			CK73GB1H102K	CHIP C	1000PF	K							C271	CK73GB1H122K	CHIP C	1200PF	K											
C102			CK73GB1C104K	CHIP C	0.10UF	K							C272	CK73GB1H102K	CHIP C	1000PF	K											
C104			CK73GB1C104K	CHIP C	0.10UF	K							C273	CK73GB1A105K	CHIP C	1.0UF	K											
C128			CK73GB1H102K	CHIP C	1000PF	K							C274	CK73FB1C224K	CHIP C	0.22UF	K											
C151			CK73GB1H182K	CHIP C	1800PF	K							C275	CK73GB1A105K	CHIP C	1.0UF	K											
C152			CK73GB1H392K	CHIP C	3900PF	K							C276,277	CK73GB1H102K	CHIP C	1000PF	K											
C161			CK73GB1H102K	CHIP C	1000PF	K							C278	CK73GB1C104K	CHIP C	0.10UF	K											
C162			C92-0507-05	CHIP-TAN	4.7UF	6.3WV							C279	C92-0516-05	CHIP-TAN	4.7UF	16WV											
C163			CK73GB1H102K	CHIP C	1000PF	K							C280	C92-0040-05	CHIP-ELE	47UF	16WV											
C164			C92-0560-05	CHIP-TAN	10UF	6.3WV							C281	CK73GB1H102K	CHIP C	1000PF	K											
C165			CK73GB1A105K	CHIP C	1.0UF	K							C282	*	CE04EQ1E331M	ELECTRO	330UF	25WV										
C201			CK73GB1C104K	CHIP C	0.10UF	K							C283	CK73GB1H102K	CHIP C	1000PF	K											
C202			CK73GB1H102K	CHIP C	1000PF	K							C301	C92-0507-05	CHIP-TAN	4.7UF	6.3WV											
C203			CK73GB1C273K	CHIP C	0.027UF	K							C302	CK73GB1H102K	CHIP C	1000PF	K											
C203			CK73GB1C273K	CHIP C	0.027UF	K							C303	CK73GB1H472K	CHIP C	4700PF	K											
C203			CK73GB1C4																									

## PARTS LIST

TX-RX UNIT (X57-685X-XX)

Ref. No.	Address	New parts	Parts No.	Description			Desti- nation	Ref. No.	Address	New parts	Parts No.	Description			Desti- nation
C310			CK73FB1C334K	CHIP C	0.33UF	K		C425			C92-0001-05	CHIP C	0.1UF	35WV	
C311,312			CK73GB1C104K	CHIP C	0.10UF	K		C426			CC73GCH1H300J	CHIP C	30PF	J	
C313			C92-0662-05	CHIP-TAN	15UF	6.3WV		C427			CC73GCH1H080B	CHIP C	8.0PF	B	
C314			CK73GB1H103K	CHIP C	0.010UF	K		C428			CK73GB1H471K	CHIP C	470PF	K	
C315-318			CK73GB1C104K	CHIP C	0.10UF	K		C429			CC73GCH1H010B	CHIP C	1.0PF	B	
C319			CK73GB1H102K	CHIP C	1000PF	K		C430			CC73GCH1H4R5B	CHIP C	4.5PF	B	
C321			CC73GCH1H680J	CHIP C	68PF	J		C431			CC73GCH1H050B	CHIP C	5.0PF	B	
C322			CC73GCH1H560J	CHIP C	56PF	J		C432			CC73GCH1H0R3B	CHIP C	0.3PF	B	
C323			CC73GCH1H271J	CHIP C	270PF	J		C434			CC73GCH1H151J	CHIP C	150PF	J	
C324			CK73GB1H103K	CHIP C	0.010UF	K		C435			CC73GCH1H100C	CHIP C	10PF	C	
C326			CK73GB1H103K	CHIP C	0.010UF	K		C436			CC73GCH1H75B	CHIP C	0.75PF	B	
C350			CK73GB1H471K	CHIP C	470PF	K		C437			CK73GB1H471K	CHIP C	470PF	K	
C351			CC73GCH1H330J	CHIP C	33PF	J		C438			CC73GCH1H0R5B	CHIP C	0.5PF	B	
C353			CK73GB1H103K	CHIP C	0.010UF	K		C439			CC73GCH1H100C	CHIP C	10PF	C	
C354			CC73GCH1H4R5B	CHIP C	4.5PF	B		C440			CC73GCH1H110G	CHIP C	11PF	G	
C355			CC73GCH1H180J	CHIP C	18PF	J		C441			CC73GCH1H0R5B	CHIP C	0.5PF	B	
C356			CC73GCH1H030B	CHIP C	3.0PF	B		C442			C92-0560-05	CHIP-TAN	10UF	6.3WV	
C357			CK73GB1H103K	CHIP C	0.010UF	K		C444			CK73GB1H471K	CHIP C	470PF	K	
C358			CK73GB1H102K	CHIP C	1000PF	K		C448,449			CK73GB1H471K	CHIP C	470PF	K	
C359			CC73GCH1H080B	CHIP C	8.0PF	B		C450			C92-0795-05	CHIP-TAN	22UF	10WV	
C360-362			CK73GB1H102K	CHIP C	1000PF	K		C451,452			CK73GB1H471K	CHIP C	470PF	K	
C363			CK73GB1H103K	CHIP C	0.010UF	K		C453			CK73GB1H221K	CHIP C	220PF	K	
C364			CK73GB1H102K	CHIP C	1000PF	K		C454			CC73GCH1H060B	CHIP C	6.0PF	B	
C366			CK73GB1C104K	CHIP C	0.10UF	K		C455			CC73GCH1H030B	CHIP C	3.0PF	B	
C367			CC73GCH1H151J	CHIP C	150PF	J		C456			CC73GCH1H020B	CHIP C	2.0PF	B	
C368			CC73GCH1H270J	CHIP C	27PF	J		C457			CK73GB1H102K	CHIP C	1000PF	K	
C369			CC73GCH1H030B	CHIP C	3.0PF	B		C458			CK73GB1H221K	CHIP C	220PF	K	
C370			CK73GB1H102K	CHIP C	1000PF	K		C459			CK73GB1H102K	CHIP C	1000PF	K	
C371			CC73GCH1H020B	CHIP C	2.0PF	B		C460			CC73GCH1H180J	CHIP C	18PF	J	
C372			CK73GB1H102K	CHIP C	1000PF	K		C461			CK73GB1H102K	CHIP C	1000PF	K	
C373			CC73GCH1H060B	CHIP C	6.0PF	B		C462			CC73GCH1H100C	CHIP C	10PF	C	
C374			CC73GCH1H270J	CHIP C	27PF	J		C463,464			CK73GB1H102K	CHIP C	1000PF	K	
C375-379			CK73GB1H102K	CHIP C	1000PF	K		C465			CC73GCH1H220J	CHIP C	22PF	J	
C380			CC73GCH1H101J	CHIP C	100PF	J		C466			CC73GCH1H101J	CHIP C	100PF	J	
C381			CC73GCH1H4R5B	CHIP C	4.5PF	B		C467			CK73GB1H102K	CHIP C	1000PF	K	
C382			CC73GCH1H270J	CHIP C	27PF	J		C468			CK73GB1H221K	CHIP C	220PF	K	
C383			CK73GB1H102K	CHIP C	1000PF	K		C471			CC73GCH1H100C	CHIP C	10PF	C	
C384			CC73GCH1H020B	CHIP C	2.0PF	B		C473-476			CK73GB1H102K	CHIP C	1000PF	K	
C385			CC73GCH1H080B	CHIP C	8.0PF	B		C501,502			CK73GB1H102K	CHIP C	1000PF	K	
C386			CC73GCH1H360J	CHIP C	36PF	J		C503			CC73GCH1H101J	CHIP C	100PF	J	
C387			CK73GB1H102K	CHIP C	1000PF	K		C504-507			CK73GB1H102K	CHIP C	1000PF	K	
C388			CC73GCH1H070B	CHIP C	7.0PF	B		C509			CC73GCH1H150J	CHIP C	15PF	J	
C389			CK73GB1H102K	CHIP C	1000PF	K		C510			CC73GCH1H080B	CHIP C	8.0PF	B	
C390			CC73GCH1H090B	CHIP C	9.0PF	B		C511-514			CK73GB1H102K	CHIP C	1000PF	K	
C391			CC73GCH1H160G	CHIP C	16PF	G		C515			CC73GCH1H270J	CHIP C	27PF	J	
C400			CK73GB1C104K	CHIP C	0.10UF	K		C516			CK73GB1H821K	CHIP C	820PF	K	
C401-403			CC73GCH1H101J	CHIP C	100PF	J		C517			CC73GCH1H030B	CHIP C	3.0PF	B	
C404			C92-0662-05	CHIP-TAN	15UF	6.3WV		C518			CC73GCH1H330J	CHIP C	33PF	J	
C406			CK73GB1H102K	CHIP C	1000PF	K		C519			CC73GCH1H820J	CHIP C	82PF	J	
C408			CC73GCH1H220J	CHIP C	22PF	J		C522			CK73FB1H102K	CHIP C	1000PF	K	
C409			CK73GB1C104K	CHIP C	0.10UF	K		C525			CK73GB1H102K	CHIP C	1000PF	K	
C410			C92-0560-05	CHIP-TAN	10UF	6.3WV		C526			CK73GB1H681K	CHIP C	680PF	K	
C411			CK73GB1C104K	CHIP C	0.10UF	K		C527			CK73GB1H102K	CHIP C	1000PF	K	
C412			C92-0560-05	CHIP-TAN	10UF	6.3WV		C528			CK73GB1H221K	CHIP C	220PF	K	
C413			CK73GB1H103K	CHIP C	0.010UF	K		C529			CK73FB1H102K	CHIP C	1000PF	K	
C414			CK73GB1C104K	CHIP C	0.10UF	K		C530			CK73FB1C474K	CHIP C	0.47UF	K	
C416-418			CK73GB1H102K	CHIP C	1000PF	K		C531			C92-0719-05	CHIP-TAN	47UF	25WV	
C421,422			CK73GB1H471K	CHIP C	470PF	K		C533			C93-0572-05	CHIP C	100PF	J	
C423			C92-0555-05	CHIP-TAN	0.047UF	35WV		C536			CK73FB1H102K	CHIP C	1000PF	K	
C424			C92-0004-05	CHIP-TAN	1.0UF	16WV		C541,542			CM73F2H120J	CHIP C	12PF	J	

## PARTS LIST

TX-RX UNIT (X57-685X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti- nation	Ref. No.	Address	New parts	Parts No.	Description	Desti- nation
C543,544			CM73F2H150J	CHIP C 15PF J		L418			L41-3375-06	SMALL FIXED INDUCTOR	
C545			C93-0603-05	CHIP C 1000PF K		L419			L41-1085-06	SMALL FIXED INDUCTOR	
C546			CK73FB1C474K	CHIP C 0.47UF K		L420			L41-1585-06	SMALL FIXED INDUCTOR	
C549			CM73F2H221J	CHIP C 220PF J		L421			L41-1085-06	SMALL FIXED INDUCTOR	
C550			CM73F2H680J	CHIP C 68PF J		L422			L40-5675-92	SMALL FIXED INDUCTOR (56NH)	
C552			C93-0564-05	CHIP C 22PF J		L423			L92-0443-05	FERRITE CHIP	
C553			C93-0553-05	CHIP C 3.0PF C		L501,502			L41-6875-08	SMALL FIXED INDUCTOR	
C554			C93-0603-05	CHIP C 1000PF K		L503,504			L41-2775-06	SMALL FIXED INDUCTOR	
C555			C93-0555-05	CHIP C 5.0PF C		L505			L34-4645-05	AIR-CORE COIL	
C556			C93-0603-05	CHIP C 1000PF K		L506			L34-4693-05	AIR-CORE COIL	
C557,558			CK73GB1H103K	CHIP C 0.010UF K		L507			L34-4732-05	AIR-CORE COIL	
C559			CK73GB1C104K	CHIP C 0.10UF K		L508			L34-4669-05	AIR-CORE COIL	
C560			CK73GB1H102K	CHIP C 1000PF K		L509			L34-4667-05	AIR-CORE COIL	
C574			CK73GB1H102K	CHIP C 1000PF K		L601	*		L34-4737-05	AIR-CORE COIL	
C576			CK73GB1H221K	CHIP C 220PF K		L602-604	*		L34-4736-05	AIR-CORE COIL	
C602			C93-0561-05	CHIP C 12PF J		L605			L34-4667-05	AIR-CORE COIL	
C603			C93-0603-05	CHIP C 1000PF K		X86	*		L78-1409-05	RESONATOR (8.00MHZ)	
C605			C93-0562-05	CHIP C 15PF J		X401	*		L77-1944-05	TCXO (16.8MHZ)	
C606			CC73GCH1H0R5B	CHIP C 0.5PF B		XF351			L71-0620-05	MCF (49.95MHZ)	
C607			CC73GCH1H020B	CHIP C 2.0PF B							
C608			C93-0565-05	CHIP C 27PF J		R1			R92-1252-05	CHIP R 0 OHM J 1/16W	
C610			CC73GCH1H0R5B	CHIP C 0.5PF B		R2,3			RK73GB1J101J	CHIP R 100 J 1/16W	
C611			CC73GCH1H020B	CHIP C 2.0PF B		R4-8			RK73GB1J102J	CHIP R 1.0K J 1/16W	
C613			C93-0565-05	CHIP C 27PF J		R31			RK73GB1J472J	CHIP R 4.7K J 1/16W	
C614			C93-0553-05	CHIP C 3.0PF C	E	R32			R92-1215-05	CHIP R 470 J 1/2W	
C615			C93-0564-05	CHIP C 22PF J		R33			RK73GB1J473J	CHIP R 47K J 1/16W	
C616,617			CK73GB1H102K	CHIP C 1000PF K		R34			RK73GB1J472J	CHIP R 4.7K J 1/16W	
C623			C93-0553-05	CHIP C 3.0PF C		R35			RK73GB1J473J	CHIP R 47K J 1/16W	
TC401			C05-0399-05	CERAMIC TRIMMER (6PF)		R36			RK73GB1J152J	CHIP R 1.5K J 1/16W	
TC402			C05-0245-05	CERAMIC TRIMMER (10PF)		R37			R92-1252-05	CHIP R 0 OHM J 1/16W	
-			E11-0425-05	3.5D PHONE JACK (3P)		R38			RK73GB1J334J	CHIP R 330K J 1/16W	
-			E37-1127-05	PROCESSED LEAD WIRE		R39			RK73GB1J474J	CHIP R 470K J 1/16W	
CN1			E40-6268-05	FLAT CABLE CONNECTOR		R40			RK73GB1J394J	CHIP R 390K J 1/16W	
CN2			E40-5705-05	PIN ASSY		R41			RK73GB1J334J	CHIP R 330K J 1/16W	
CN5			E40-3246-05	PIN ASSY		R61			RK73GB1J471J	CHIP R 470 J 1/16W	
F1			F53-0246-05	FUSE (4.0A/32V)		R62,63			R92-1252-05	CHIP R 0 OHM J 1/16W	
F501			F53-0108-05	FUSE (1.8A/50V)		R70			RK73GB1J473J	CHIP R 47K J 1/16W	
CF301			L72-0993-05	CERAMIC FILTER		R81			RK73GB1J473J	CHIP R 47K J 1/16W	
CF302			L72-0999-05	CERAMIC FILTER		R82			R92-1252-05	CHIP R 0 OHM J 1/16W	
L101			L92-0443-05	FERRITE CHIP		R86			R92-1252-05	CHIP R 0 OHM J 1/16W	
L201			L92-0443-05	FERRITE CHIP		R87			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L301			L34-4554-05	COIL		R91,92			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L302			L41-3385-08	SMALL FIXED INDUCTOR		R93			RK73GB1J682J	CHIP R 6.8K J 1/16W	
L303,304			L40-3381-86	SMALL FIXED INDUCTOR (0.33UH)		R94			RK73GB1J103J	CHIP R 10K J 1/16W	
L351			L41-8285-08	SMALL FIXED INDUCTOR		R101,102			RK73GB1J473J	CHIP R 47K J 1/16W	
L352			L41-5685-08	SMALL FIXED INDUCTOR		R103-106			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L354-356			L34-4612-05	AIR-CORE COIL		R109			RK73GB1J152J	CHIP R 1.5K J 1/16W	
L357			L34-4610-05	AIR-CORE COIL		R110			RK73GB1J473J	CHIP R 47K J 1/16W	
L401			L92-0443-05	FERRITE CHIP		R111			RK73GB1J102J	CHIP R 1.0K J 1/16W	
L403			L41-1005-08	SMALL FIXED INDUCTOR		R114			RK73GB1J473J	CHIP R 47K J 1/16W	
L404			L92-0442-05	FERRITE CHIP		R118			R92-1252-05	CHIP R 0 OHM J 1/16W	
L405			L92-0443-05	FERRITE CHIP		R119			R92-0670-05	CHIP R 0 OHM	K,M3,M4
L406,407			L40-2785-92	SMALL FIXED INDUCTOR (270NH)		R119			R92-0670-05	CHIP R 0 OHM	E
L408			L40-3378-67	SMALL FIXED INDUCTOR (33NH)		R120			R92-1252-05	CHIP R 0 OHM J 1/16W	M4
L409,410			L40-2702-86	SMALL FIXED INDUCTOR (27UH)		R120-123			R92-1252-05	CHIP R 0 OHM J 1/16W	K
L411,412			L40-2785-92	SMALL FIXED INDUCTOR (270NH)		R122,123			R92-1252-05	CHIP R 0 OHM J 1/16W	M2,M3,M4
L413			L40-4778-67	SMALL FIXED INDUCTOR (47NH)		R124-127			RK73GB1J473J	CHIP R 47K J 1/16W	
L414,415			L40-2702-86	SMALL FIXED INDUCTOR (27UH)		R151			RK73GB1J103J	CHIP R 10K J 1/16W	
L416,417			L92-0443-05	FERRITE CHIP		R152			RK73GB1J472J	CHIP R 4.7K J 1/16W	

## PARTS LIST

TX-RX UNIT (X57-685X-XX)

Ref. No.	Address	New parts	Parts No.	Description			Desti- nation	Ref. No.	Address	New parts	Parts No.	Description			Desti- nation
R161			RK73GB1J122J	CHIP R	1.2K	J	1/16W	R271			RK73GB1J332J	CHIP R	3.3K	J	1/16W
R162			RK73GB1J152J	CHIP R	1.5K	J	1/16W	R272			RK73GB1J392J	CHIP R	3.9K	J	1/16W
R164-166			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R273			RK73GB1J123J	CHIP R	12K	J	1/16W
R200			RK73GB1J681J	CHIP R	680	J	1/16W	R274,275			RK73GB1J153J	CHIP R	15K	J	1/16W
R203			RK73GB1J104J	CHIP R	100K	J	1/16W	R276			RK73GB1J473J	CHIP R	47K	J	1/16W
R204			RK73GB1J103J	CHIP R	10K	J	1/16W	R277			RK73GB1J683J	CHIP R	68K	J	1/16W
R204			RK73GB1J183J	CHIP R	18K	J	1/16W	R278			RK73GB1J123J	CHIP R	12K	J	1/16W
R204			RK73GB1J183J	CHIP R	18K	J	1/16W	R279			RK73GB1J472J	CHIP R	4.7K	J	1/16W
R205			RK73GB1J821J	CHIP R	820	J	1/16W	R280			RK73GB1J391J	CHIP R	390	J	1/16W
R206			RK73GB1J101J	CHIP R	100	J	1/16W	R281			R92-0670-05	CHIP R	0 OHM		
R207			RK73GB1J105J	CHIP R	1.0M	J	1/16W	R301,302			RK73GB1J472J	CHIP R	4.7K	J	1/16W
R207			RK73GB1J754J	CHIP R	750K	J	1/16W	R303			RK73GB1J223J	CHIP R	22K	J	1/16W
R207			RK73GB1J754J	CHIP R	750K	J	1/16W	R304			RK73GB1J472J	CHIP R	4.7K	J	1/16W
R208			RK73GB1J152J	CHIP R	1.5K	J	1/16W	R305			RK73GB1J182J	CHIP R	1.8K	J	1/16W
R209			RK73GB1J244J	CHIP R	240K	J	1/16W	R306			RK73GB1J274J	CHIP R	270K	J	1/16W
R210			RK73GB1J183J	CHIP R	18K	J	1/16W	R308			RK73GB1J334J	CHIP R	330K	J	1/16W
R211,212			RK73GB1J823J	CHIP R	82K	J	1/16W	R309			RK73GB1J332J	CHIP R	3.3K	J	1/16W
R213			RK73GB1J334J	CHIP R	330K	J	1/16W	R310			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R214,215			RK73GB1J683J	CHIP R	68K	J	1/16W	R311			RK73GB1J333J	CHIP R	33K	J	1/16W
R216			RK73GB1J274J	CHIP R	270K	J	1/16W	R312			RK73GB1J473J	CHIP R	47K	J	1/16W
R217			RK73GB1J224J	CHIP R	220K	J	1/16W	R313			RK73GB1J104J	CHIP R	100K	J	1/16W
R218			RK73GB1J823J	CHIP R	82K	J	1/16W	R314			RK73GB1J222J	CHIP R	2.2K	J	1/16W
R219			RK73GB1J124J	CHIP R	120K	J	1/16W	R315			RK73GB1J183J	CHIP R	18K	J	1/16W
R220,221			RK73GH1J153D	CHIP R	15K	D	1/16W	R316			RK73GB1J223J	CHIP R	22K	J	1/16W
R222			RK73GB1J103J	CHIP R	10K	J	1/16W	R317-320			RK73GB1J103J	CHIP R	10K	J	1/16W
R224			RK73GB1J561J	CHIP R	560	J	1/16W	R321			RK73GB1J223J	CHIP R	22K	J	1/16W
R225			RK73GB1J154J	CHIP R	150K	J	1/16W	R322			RK73GB1J101J	CHIP R	100	J	1/16W
R226			RK73GB1J104J	CHIP R	100K	J	1/16W	R323			RK73GB1J124J	CHIP R	120K	J	1/16W
R227			RK73GB1J223J	CHIP R	22K	J	1/16W	R324			R92-1252-05	CHIP R	0 OHM	J	1/16W
R228			RK73GB1J103J	CHIP R	10K	J	1/16W	R325			RK73GB1J333J	CHIP R	33K	J	1/16W
R229			RK73GB1J684J	CHIP R	680K	J	1/16W	R349			RK73GB1J473J	CHIP R	47K	J	1/16W
R230			RK73GB1J224J	CHIP R	220K	J	1/16W	R350			RK73GB1J273J	CHIP R	27K	J	1/16W
R231			RK73GB1J124J	CHIP R	120K	J	1/16W	R351			RK73GB1J471J	CHIP R	470	J	1/16W
R232			RK73GB1J912J	CHIP R	9.1K	J	1/16W	R352			RK73GB1J101J	CHIP R	100	J	1/16W
R233			RK73GB1J682J	CHIP R	6.8K	J	1/16W	R353			RK73GB1J104J	CHIP R	100K	J	1/16W
R234			R92-1252-05	CHIP R	0 OHM	J	1/16W	R354			RK73GB1J331J	CHIP R	330	J	1/16W
R236			RK73GB1J103J	CHIP R	10K	J	1/16W	R355			RK73GB1J471J	CHIP R	470	J	1/16W
R237			R92-1252-05	CHIP R	0 OHM	J	1/16W	R356			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R246			RK73GB1J154J	CHIP R	150K	J	1/16W	R358			RK73GB1J221J	CHIP R	220	J	1/16W
R247			RK73GB1J124J	CHIP R	120K	J	1/16W	R359			RK73GB1J224J	CHIP R	220K	J	1/16W
R248			RK73GB1J562J	CHIP R	5.6K	J	1/16W	R360			RK73GB1J474J	CHIP R	470K	J	1/16W
R249			RK73GB1J153J	CHIP R	15K	J	1/16W	R361			RK73GB1J181J	CHIP R	180	J	1/16W
R250			RK73GB1J123J	CHIP R	12K	J	1/16W	R362			RK73GB1J474J	CHIP R	470K	J	1/16W
R251			RK73GB1J473J	CHIP R	47K	J	1/16W	R363			RK73GB1J334J	CHIP R	330K	J	1/16W
R252			RK73GB1J474J	CHIP R	470K	J	1/16W	R364			R92-1252-05	CHIP R	0 OHM	J	1/16W
R253			R92-1252-05	CHIP R	0 OHM	J	1/16W	R365			RK73GB1J104J	CHIP R	100K	J	1/16W
R254			RK73GB1J272J	CHIP R	2.7K	J	1/16W	R366			RK73GB1J471J	CHIP R	470	J	1/16W
R255,256			RK73GB1J562J	CHIP R	5.6K	J	1/16W	R367			RK73GB1J101J	CHIP R	100	J	1/16W
R257			RK73GB1J105J	CHIP R	1.0M	J	1/16W	R368			RK73GB1J104J	CHIP R	100K	J	1/16W
R258			RK73GB1J272J	CHIP R	2.7K	J	1/16W	R369			R92-1252-05	CHIP R	0 OHM	J	1/16W
R259			RK73GB1J123J	CHIP R	12K	J	1/16W	R370			RK73GB1J560J	CHIP R	56	J	1/16W
R260			RK73GB1J224J	CHIP R	220K	J	1/16W	R371			RK73GB1J393J	CHIP R	39K	J	1/16W
R261			RK73GB1J124J	CHIP R	120K	J	1/16W	R372,373			RK73GB1J473J	CHIP R	47K	J	1/16W
R262			RK73GB1J183J	CHIP R	18K	J	1/16W	R374			RK73GB1J273J	CHIP R	27K	J	1/16W
R263			RK73GH1J913D	CHIP R	91K	D	1/16W	R375,376			RK73GB1J104J	CHIP R	100K	J	1/16W
R264			RK73GH1J124D	CHIP R	120K	D	1/16W	R379			RK73GB1J104J	CHIP R	100K	J	1/16W
R265			RK73GH1J562D	CHIP R	5.6K	D	1/16W	R401-403			RK73GB1J102J	CHIP R	1.0K	J	1/16W
R266			RK73GB1J562J	CHIP R	5.6K	J	1/16W	R404			RK73GB1J103J	CHIP R	10K	J	1/16W
R268			RK73GB1J102J	CHIP R	1.0K	J	1/16W	R406			RK73GB1J103J	CHIP R	10K	J	1/16W
R269			RK73GB1J393J	CHIP R	39K	J	1/16W	R407			RK73GB1J152J	CHIP R	1.5K	J	1/16W

K,M2,M3,M4 : TM-271A

E : TM-271E

## PARTS LIST

TX-RX UNIT (X57-685X-XX)

Ref. No.	Address	New parts	Parts No.	Description			Desti-nation	Ref. No.	Address	New parts	Parts No.	Description			Desti-nation
R408			RK73GB1J100J	CHIP R	10	J	1/16W	R532,533			R92-1252-05	CHIP R	0 OHM	J	1/16W
R409			RK73GB1J104J	CHIP R	100K	J	1/16W	R601,602			RK73GB1J223J	CHIP R	22K	J	1/16W
R410			RK73GB1J822J	CHIP R	8.2K	J	1/16W	R605			RK73GB1J153J	CHIP R	15K	J	1/16W
R411			RK73GB1J562J	CHIP R	5.6K	J	1/16W	R606			RK73GB1J221J	CHIP R	220	J	1/16W
R412,413			RK73GB1J103J	CHIP R	10K	J	1/16W	R607			RK73GB1J331J	CHIP R	330	J	1/16W
R414			RK73GB1J471J	CHIP R	470	J	1/16W	R800			R92-1061-05	JUMPER			
R415			R92-1252-05	CHIP R	0 OHM	J	1/16W	VR601			R12-6427-05	TRIMMING POT. (47K/12)			
R416			RK73GB1J471J	CHIP R	470	J	1/16W	D1-6			DA221	DIODE			
R417			RK73GB1J224J	CHIP R	220K	J	1/16W	D31			ZSH5MA27	SURGE ABSORBER			
R418			RK73GB1J102J	CHIP R	1.0K	J	1/16W	D32			1812L110PR	VARISTOR			
R419			RK73GB1J272J	CHIP R	2.7K	J	1/16W	D61			02DZ18(X,Y)	ZENER DIODE			
R420			RK73GB1J102J	CHIP R	1.0K	J	1/16W	D62			MA2S077	DIODE			
R421			RK73GB1J152J	CHIP R	1.5K	J	1/16W	D201			DAN222	DIODE			
R422			RK73GB1J103J	CHIP R	10K	J	1/16W	D202			1SS372	DIODE			
R423			RK73GB1J221J	CHIP R	220	J	1/16W	D251			MA742	DIODE			
R424			RK73GB1J101J	CHIP R	100	J	1/16W	D301			MA742	DIODE			
R425,426			RK73GB1J473J	CHIP R	47K	J	1/16W	D302,303			DAN222	DIODE			
R427			RK73GB1J104J	CHIP R	100K	J	1/16W	D351-354			HVC376B	VARIABLE CAPACITANCE DIODE			
R428			RK73GB1J473J	CHIP R	47K	J	1/16W	D401			MA2S111	DIODE			
R429			RK73GB1J271J	CHIP R	270	J	1/16W	D402			HZU5ALL	DIODE			
R430			RK73GB1J221J	CHIP R	220	J	1/16W	D403-406			MA2S304	VARIABLE CAPACITANCE DIODE			
R431			RK73GB1J104J	CHIP R	100K	J	1/16W	D407			1SV278	VARIABLE CAPACITANCE DIODE			
R432			RK73GB1J102J	CHIP R	1.0K	J	1/16W	D408			MA2S111	DIODE			
R433			RK73GB1J472J	CHIP R	4.7K	J	1/16W	D409			DAN235E	DIODE			
R434			R92-1252-05	CHIP R	0 OHM	J	1/16W	D501			1SS355	DIODE			
R435			RK73GB1J101J	CHIP R	100	J	1/16W	D502			DA221	DIODE			
R436			RK73GB1J124J	CHIP R	120K	J	1/16W	D503			02DZ5.1(Y)	ZENER DIODE			
R437			RK73GB1J102J	CHIP R	1.0K	J	1/16W	D602			MA4PH633	DIODE			
R438			RK73GB1J223J	CHIP R	22K	J	1/16W	D603			XB15A709	DIODE			
R439			RK73GB1J473J	CHIP R	47K	J	1/16W	D605			XB15A709	DIODE			
R440-442			RK73GB1J101J	CHIP R	100	J	1/16W	D606,607			MA742	DIODE			
R443			RK73GB1J222J	CHIP R	22K	J	1/16W	D608			1SS355	DIODE			
R444			RK73GB1J102J	CHIP R	1.0K	J	1/16W	IC31			KIA7808AF	ANALOG IC			
R501			RK73GB1J102J	CHIP R	1.0K	J	1/16W	IC32,33			NJM78L05UA	BI-POLAR IC			
R502			RK73GB1J271J	CHIP R	270	J	1/16W	IC34			BD4732G	MOS IC			
R503			RK73GB1J180J	CHIP R	18	J	1/16W	IC66			BD4740G	MOS IC			
R504			RK73GB1J271J	CHIP R	270	J	1/16W	IC66			AT24C64A10SI18	ROM IC			
R505			RK73GB1J222J	CHIP R	2.2K	J	1/16W	IC101							
R506			RK73GB1J103J	CHIP R	10K	J	1/16W	IC161							
R507			RK73GB1J100J	CHIP R	10	J	1/16W	IC201							
R509			RK73GB1J220J	CHIP R	22	J	1/16W	IC202							
R510			RK73GB1J152J	CHIP R	1.5K	J	1/16W	IC203							
R511			RK73FB2A470J	CHIP R	47	J	1/10W	IC204,205							
R512			RK73FB2A100J	CHIP R	10	J	1/10W	IC251							
R513			RK73FB2A222J	CHIP R	2.2K	J	1/10W	2B							
R514			R92-1217-05	CHIP R	0 OHM			IC252			LA4600	BI-POLAR IC			
R516			R92-0670-05	CHIP R	0 OHM			IC301			TK14489V	BI-POLAR IC			
R518			RK73EB2B330J	CHIP R	33	J	1/8W	IC401							
R519			RK73GB1J333J	CHIP R	33K	J	1/16W	IC402							
R520			RK73GB1J183J	CHIP R	18K	J	1/16W	IC501							
R521			RK73GB1J101J	CHIP R	100	J	1/16W	Q31							
R522			RK73EB2B331J	CHIP R	330	J	1/8W	Q32							
R523			RK73GB1J393J	CHIP R	39K	J	1/16W	Q33							
R524			R92-1215-05	CHIP R	470	J	1/2W	Q34							
R525			RK73GB1J563J	CHIP R	56K	J	1/16W	Q35							
R526			R92-1261-05	CHIP R	150	J	1/2W	Q36							
R527			RK73GB1J224J	CHIP R	220K	J	1/16W	Q61							
R528,529			RK73GB1J471J	CHIP R	470	J	1/16W	Q86,87							
R530			RK73GB1J102J	CHIP R	1.0K	J	1/16W	Q201							
R531			RK73GB1J473J	CHIP R	47K	J	1/16W				2SK1830	FET			
											2SC4919	TRANSISTOR			

# TM-271A/271E

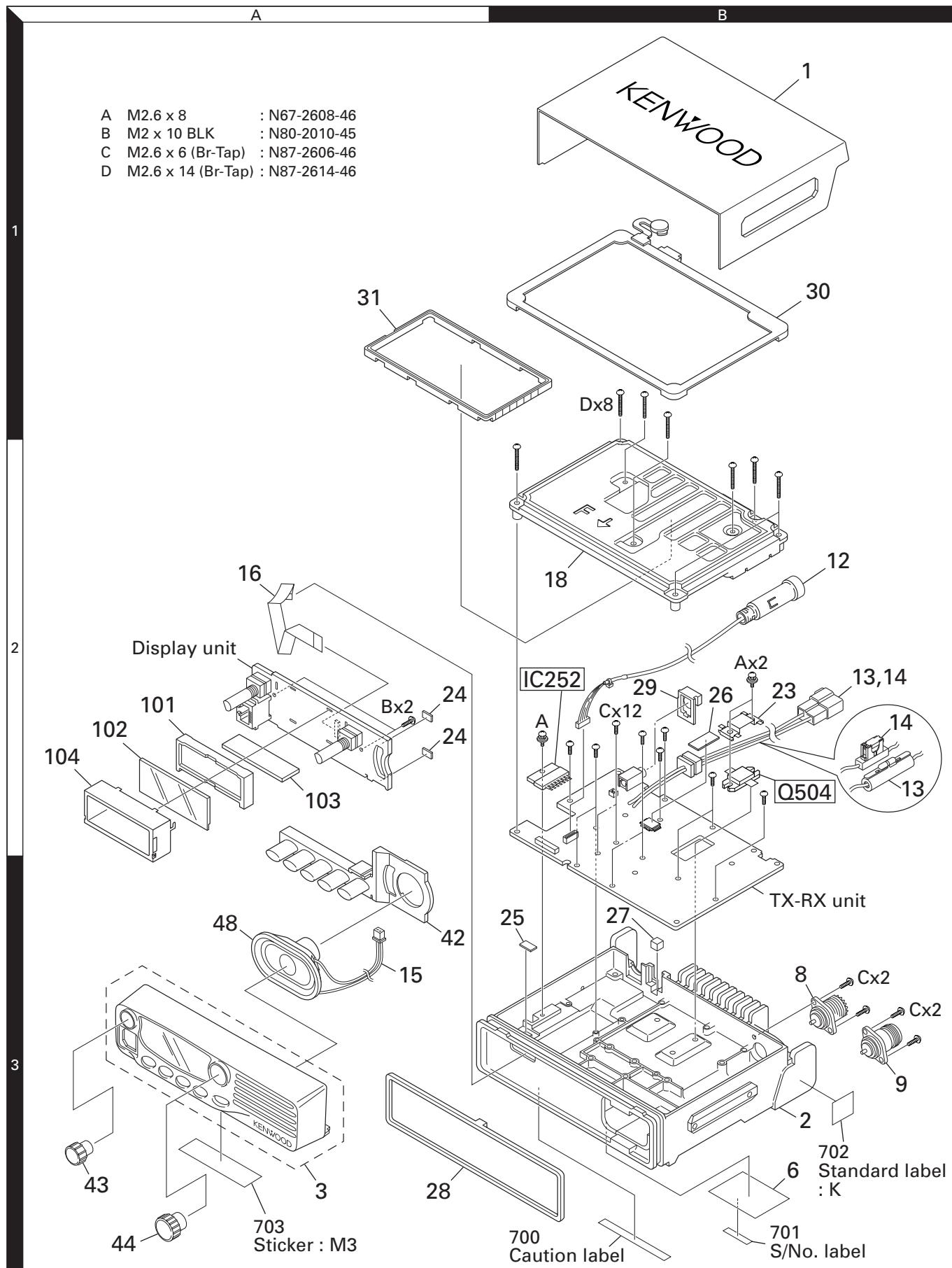
# PARTS LIST

## TX-RX UNIT (X57-685X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Desti- nation
Q251			2SC2412K	TRANSISTOR	
Q252,253			2SK3019	FET	
Q254			DTC363EU	DIGITAL TRANSISTOR	
Q255			KRC102S	DIGITAL TRANSISTOR	
Q301,302			2SC2412K	TRANSISTOR	
Q351		*	2SC5488	TRANSISTOR	
Q352,353			3SK318	FET	
Q354			2SK1830	FET	
Q402			2SA1832(GR)	TRANSISTOR	
Q403			2SC4738(GR)	TRANSISTOR	
Q404			2SC4649(N,P)	TRANSISTOR	
Q405,406			2SK508NV(K52)	FET	
Q407			2SJ347	FET	
Q408			KRX102U	TRANSISTOR	
Q410			2SC5108(Y)	TRANSISTOR	
Q411			2SC4649(N,P)	TRANSISTOR	
Q440			2SC2412K	TRANSISTOR	
Q501,502			2SC3357	TRANSISTOR	
Q503			PD55003TR	DRIVE FET	
Q504	2B		RD70HVF1-01	FINAL FET	
TH97,98		*	NCP18WF104J03	THERMISTOR	
TH301		*	NCP18WF104J03	THERMISTOR	

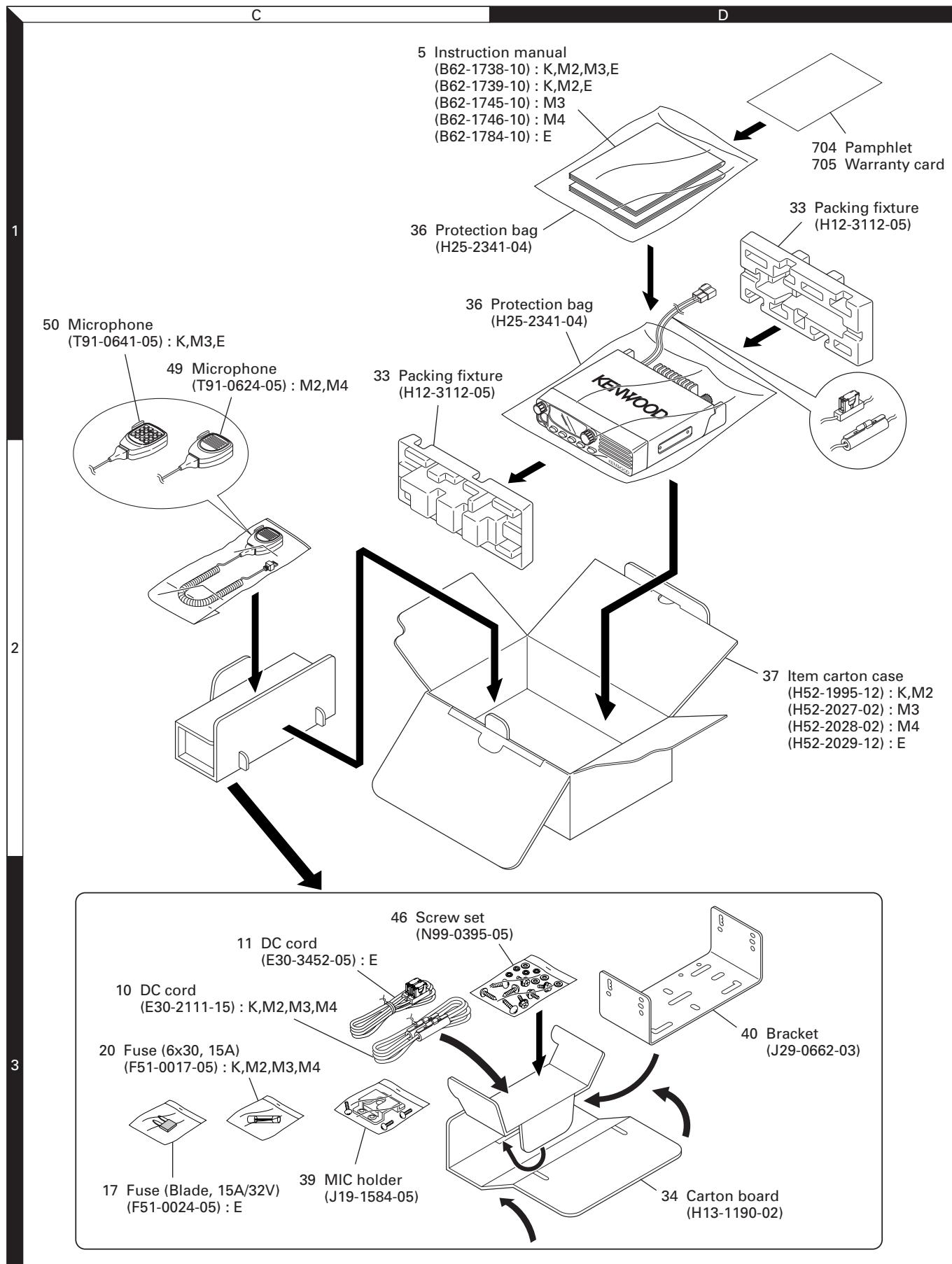
Ref. No.	Address	New parts	Parts No.	Description	Desti- nation

## EXPLODED VIEW



Parts with the exploded numbers larger than 700 are not supplied.

## PACKING



Parts with the exploded numbers larger than 700 are not supplied.

# RESETTING THE TRANSCEIVER

## Resetting the Transceiver

If your transceiver seems to be malfunctioning, resetting the microprocessor may solve the problem. The following 2 reset modes are available. When performing the reset, you may lose memory data and stored information. Back up or write down important data before performing the reset.

## Initial Settings

The factory defaults for the operating frequencies are as follows.

Transceiver : 144.000MHz

The Memory Channels have no data stored. The Weather Radio frequency (AL channel) is restored as 162.550MHz (K market model only). The Call Channel and frequency step size default values.

**Note :** When in Channel Display Mode or while Key Lock is activated, you cannot perform VFO reset or Full reset.

## Full Reset

This resets all transceiver parameters to the factory default values. There are two methods available for resetting the transceiver.

### • Full Reset Method 1:

1. With the transceiver power OFF, press [F]+[φ] (Power).  
• All indicators light momentarily, followed by the full reset confirmation message.

#FLRS TR

2. Press [F].  
• "SURE ?" appears.  
• Press any key other than [F] to cancel.
3. Press [F] again to reset the transceiver.  
• "WAIT" appears momentarily.

### • Full Reset Method 2:

1. Press [F], [MENU] and turn the Tuning control to select Menu No. 99 (RESET).
2. Press [MENU] and turn the Tuning control to select "FULL".
3. Press [MENU].  
• "SURE ?" appears.

#SURE ? 99

- Press any key other than [MENU] to cancel.
4. Press [MENU] to reset the transceiver.  
• "WAIT" appears momentarily.

## ■ VFO Reset

This resets the transceiver parameters excluding the DTMF Memory, the Memory channel contents, and the Call channel contents. There are two methods available for resetting the transceiver.

**Note :** Menu No. 7 (P.VFO) and Menu No. 10 (OFFSET) return to the factory default values.

### • VFO Reset Method 1:

1. With the transceiver power OFF, press [VFO]+[φ] (Power).  
• The VFO reset confirmation message appears.

#VFRSTP

2. Press [VFO].  
• "SURE ?" appears.  
• Press any key other than [VFO] to cancel.
3. Press [VFO] again to reset the transceiver.  
• "WAIT" appears momentarily.

### • VFO Reset Method 2:

1. Press [F], [MENU] and turn the Tuning control to select Menu No. 99 (RESET).
2. Press [MENU] and turn the Tuning control to select "VFO".
3. Press [MENU].  
• "SURE ?" appears.

#SURE ? 99

- Press any key other than [MENU] to cancel.
4. Press [MENU] to reset the transceiver.

## ADJUSTMENT

## Adjustment Mode

In Adjustment Mode, the transceiver can be adjusted using its panel keys.

## ■ Items that can be adjusted in Adjustment Mode \*1

1. Frequency Tune	7. DCS Fine Deviation *3
2. Transmit High Power *2	8. DTMF Fine Deviation
3. Transmit Low Power *2	9. Band Pass Tuning *4
4. DCS Balance *3	10. Squelch Tight *5
5. Max Deviation *3	11. Squelch Open *5
6. CTCSS Fine Deviation *3	12. S-Meter S1 Level
	13. S-Meter Full Level

## Note :

- \*1 : The PLL lock voltage and Max Power Alignment for transmission cannot be adjusted in Adjustment Mode.
- \*2 : Adjusted in 5 points in the transmission operating frequency range.
- \*3 : Adjusted in 3 points for the Wide Band Width in the transmission operating frequency range.  
Adjusted in 1 point for the Narrow Band Width
- \*4 : Adjusted in 3 points in the reception operating frequency range.
- \*5 : Adjusted in 3 points for the Wide Band Width in the reception operating frequency range.  
Adjusted in 1 point for the Narrow Band Width

## ■ How to Enter Adjustment Mode

To perform adjustments with transceiver panel keys, the transceiver must be set to "Adjustment Mode".

While shorting the following figure terminals on the PCB with tweezers, etc., turn the power switch ON to enter Adjustment Mode. (See Fig. 1.)

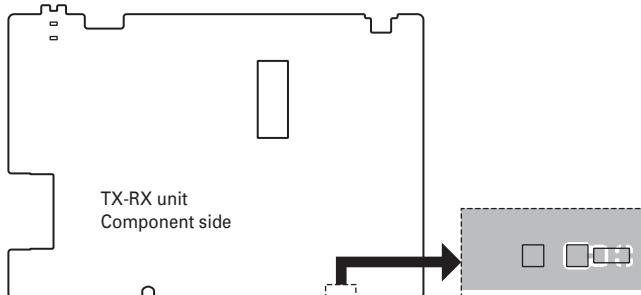


Fig. 1

## ■ LCD Display When Adjustment Mode is Enabled

Example of Frequency Tune. See "Table 1" for an LCD display list.

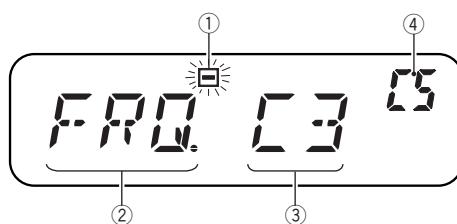


Fig. 2

- ① Blinks in Adjustment Mode.
- ② Adjustment item display
- ③ Adjustment value display. Can be adjusted while it is "blinking".  
Displayed as a hexadecimal number from 00 to FF.
- ④ Adjustment value stored in memory.  
When an adjustment value is determined, it is equal to the value in "3".

## ■ Panel Key Operation Method in Adjustment Mode

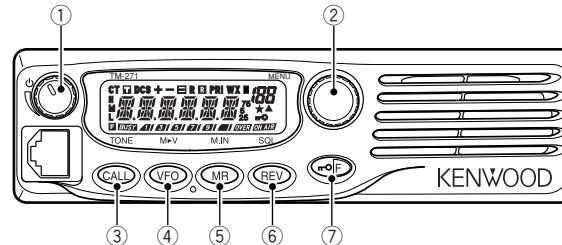


Fig. 3

- ① Power switch/Volume control
- ② When the knob is pressed once, the adjustment value display blinks. (Select an adjustment item with "4" or "5" key before performing the operation. It cannot be performed while transmitting.)  
When the knob is rotated while the adjustment display is blinking, the adjustment value changes. (Adjust transmission items while transmitting.)  
When the knob is pressed again, the adjustment value stops blinking and lights, and the adjustment value is saved in the memory of the transceiver. (For transmission item adjustment, enter receive mode before performing the operation.)
- ③ Changing between adjustment value display and frequency display  
The display changes as follows : Adjustment value display → Transmit frequency display → Receive frequency display → Adjustment value display.  
The frequency for adjustment can be confirmed.
- ④ Moves the adjustment item backward. (If it is operated when a frequency is displayed, the adjustment item display returns.)
- ⑤ Moves the adjustment item forward. (If it is operated when a frequency is displayed, the adjustment item display returns.)
- ⑥ If it is pressed before determining the adjustment value, the adjustment value of the Adjustment item returns to its original value.
- ⑦ Not used in Adjustment Mode.

## Note :

If Max Power for transmission is low, check the DC cable.  
If the DC cable connector has poor contact due to rust or stain, voltage may drop occur frequently and correct transmission power may not be supplied.

In this case, polish the DC cable connector. If the problem still persists, replace the DC cable with a new one.

## ADJUSTMENT

Adjustment Item	Adjustment Frequency Point	On the Display	Note	Transmit (MHz)	Receive (MHz)	Signalling
Frequency Tune	Center	FRQ		155.10	155.05	
TX High Power	Low	HPL	"H" icon appear	136.10	136.05	
	Low'	HPL L		142.10	142.05	
	Center	HPC		150.10	150.05	
	High'	HPH L		156.10	156.05	
	High	HPH		173.90	173.95	
TX Low Power	Low	LPL	"L" icon appear	136.10	136.05	
	Low'	LPL L		142.10	142.05	
	Center	LPC		150.10	150.05	
	High'	LPH L		156.10	156.05	
	High	LPH		173.90	173.95	
DCS Balance	Low	BRLL	"DCS" icon appear	136.10	136.05	DCS : 023N
	Center	BRLC		155.10	155.05	
	High	BRLH		173.90	173.95	
DCS Balance (Narrow)	Center	BRLC	"DCS" and "N" icon appear	155.10	155.05	
Max Deviation	Low	MAXL		136.10	136.05	
	Center	MAXC		155.10	155.05	
	High	MAXH		173.90	173.95	
Max Deviation (Narrow)	Center	MAXC	"N" icon appear	155.10	155.05	
CTCSS Fine Deviation	Low	IVL	"CT" icon appear	136.10	136.05	CTCSS : 88.5Hz
	Center	IVC		155.10	155.05	
	High	IVH		173.90	173.95	
CTCSS Fine Deviation (Narrow)	Center	IVC	"CT" and "N" icon appear	155.10	155.05	
DCS Fine Deviation	Low	IVL	"DCS" icon appear	136.10	136.05	DCS : 023N
	Center	IVC		155.10	155.05	
	High	IVH		173.90	173.95	
DCS Fine Deviation (Narrow)	Center	IVC	"DCS" and "N" icons appear	155.10	155.05	
DTMF Fine Deviation	Center	IT		155.10	155.05	DTMF : 9
DTMF Fine Deviation (Narrow)	Center	IT	"N" icon appear	155.10	155.05	
Band Pass Tuning	Low	BPL	"BUSY" icon appear	136.10	136.05	
	Center	BPC		155.10	155.05	
	High	BPH		173.90	173.95	
Squelch Tight	Low	SOTL		136.10	136.05	
	Center	SOTC		146.10	146.05	
	High	SOTH		173.90	173.95	
Squelch Tight (Narrow)	Center	SOTC	"N" icon appear	146.10	146.05	
Squelch Open	Low	SOOL		136.10	136.05	
	Center	SOOC		146.10	146.05	
	High	SOOH		173.90	173.95	
Squelch Open (Narrow)	Center	SOOC	"N" icon appear	146.10	146.05	
S-Meter S1 Level	Center	51		146.10	146.05	
S-Meter Full Level	Center	57		146.10	146.05	

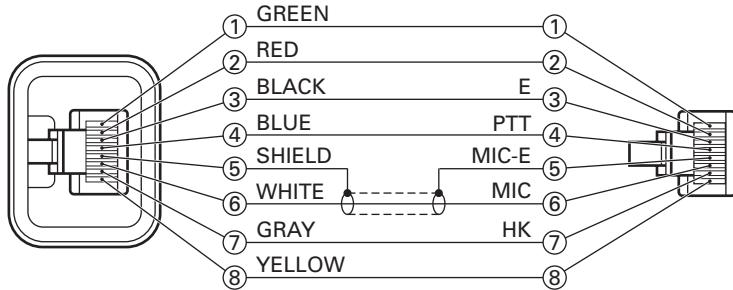
Table 1 Adjustment items, display and test frequency list

## ADJUSTMENT

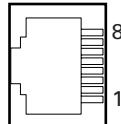
## Test Equipment Required for Alignment

Test Equipment	Major Specifications	
1. Standard Signal Generator (SSG)	Frequency Range	136 to 175MHz
	Modulation Output	Frequency modulation and external modulation -127dBm/0.1μV to greater than -7dBm/100mV
2. Power Meter	Input Impedance	50Ω
	Operation Frequency	136 to 175MHz or more
	Measurement Capability	Vicinity of 100W
3. Deviation Meter	Frequency Range	136 to 175MHz
4. Digital Volt Meter (DVM)	Measuring Range	1 to 20V DC
	Accuracy	High input impedance for minimum circuit loading
5. Oscilloscope		DC through 30MHz
6. High Sensitivity Frequency Counter	Frequency Range	10Hz to 1000MHz
	Frequency Stability	0.2ppm or less
7. Ammeter		20A
8. AF Volt Meter (AF VTVM)	Frequency Range	50Hz to 10kHz
	Voltage Range	1mV to 3V
9. Audio Generator (AG)	Frequency Range	20Hz to 20kHz or more
	Output	0 to 1V
10. Distortion Meter	Capability	3% or less at 1kHz
	Input Level	50mV to 10Vrms
11. 8Ω Dummy Load		Approx. 8Ω, 10W or more
12. Regulated Power Supply		13.8V, approx. 20A (adjustable from 9 to 17V) Useful if ammeter equipped
13. Spectrum Analyzer	Center frequency	50KHz to 1000MHz
14. Tracking Generator	Output Voltage	100mV or more

## Test cable for microphone input (E30-3360-08)



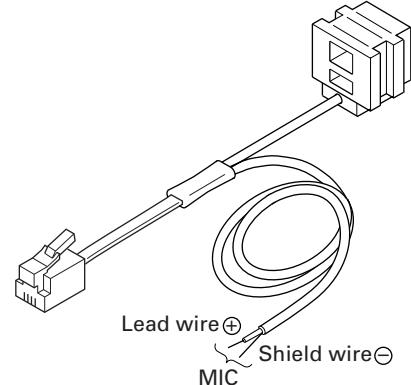
MIC connector (Front view)



- 1 : BLC
- 2 : PSB
- 3 : E
- 4 : PTT
- 5 : ME
- 6 : MIC
- 7 : HOOK
- 8 : CM

## Tuning cable (E30-3383-05)

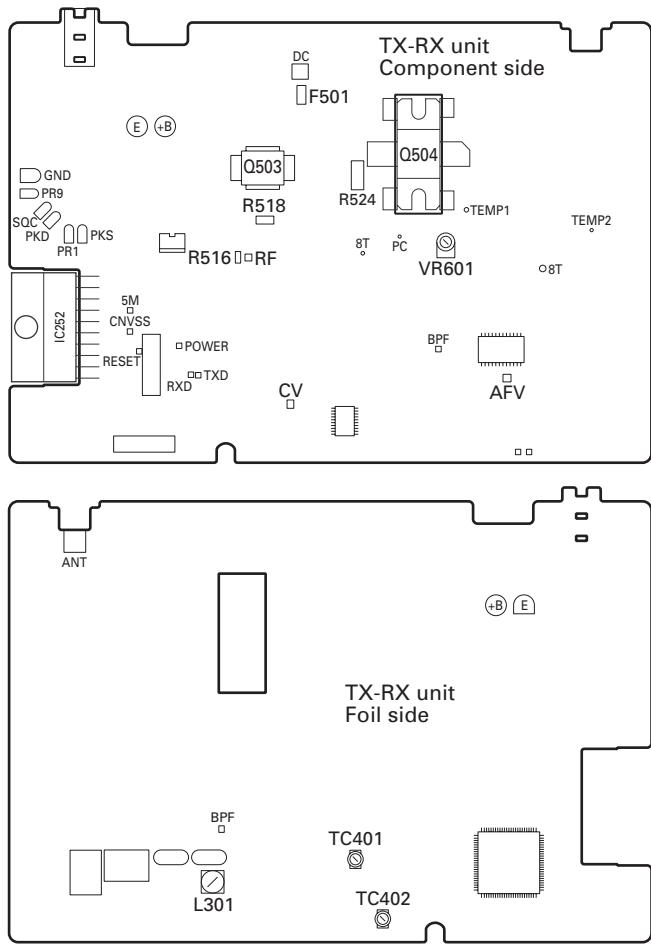
Adapter cable (E30-3383-05) is required for injecting an audio if adjustment mode is used.



# ADJUSTMENT

## Adjustment Location

## ■ Adjustment Points



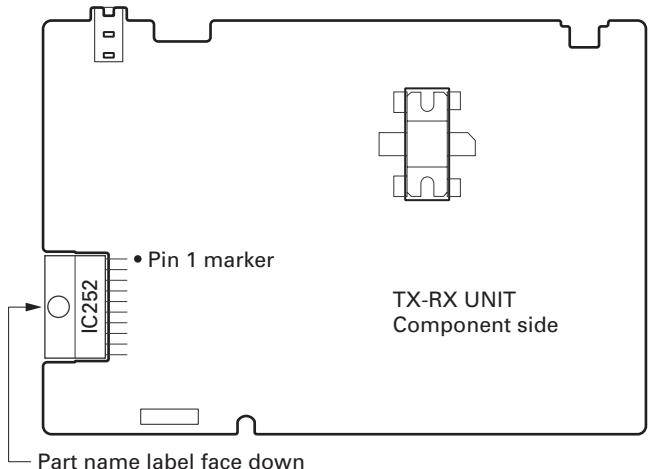
## ■ Notes

- EEPROM

The tuning data (Deviation, Squelch, etc.) for the EEPROM, is stored in memory. When parts are changed, re-adjust the transceiver.

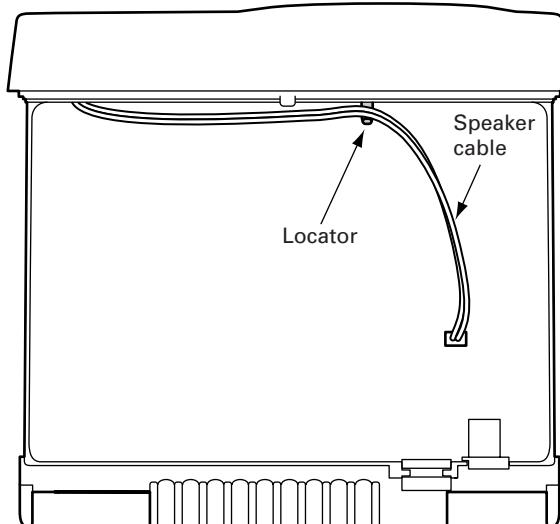
- AF PA IC (IC252)

## How to mounting the IC252.



- Speaker Cable

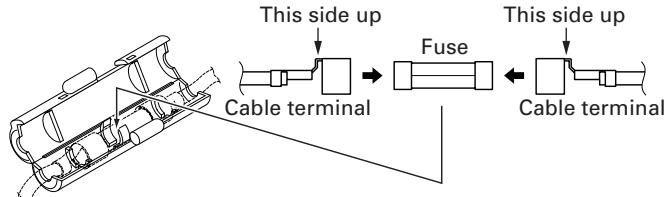
The speaker cable should be formed before mounting the shield cover as below.



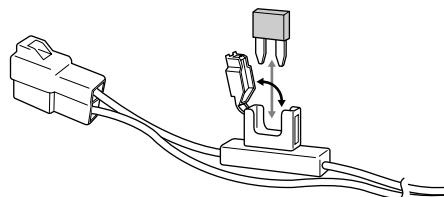
- **Fuse**

To mount the fuse, the cable terminal direction must be as follow.

- Except the E type models



- E type models



## ADJUSTMENT

## PCB Section

Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test equipment	Terminal	Parts	Method	
1. Setting	1) Power supply voltage DC Power supply terminal : 13.8V					
2. VCO lock voltage*	1) CH : TX high	Digital voltmeter	CV	TC402	5.5V	±0.2V
	2) CH : RX high			TC401	5.5V	±0.2V
	3) CH : TX low				Check	0.5V or more
	4) CH : RX low					
3. IF coil	1) CH : RX center (Wide) 2) SSG output : -53dBm (501μV) Mod : 1kHz Dev : 3kHz	SSG Digital voltmeter	AFV	L301	3.25~3.35V (DC)	

## \* Adjustment of TX VCO lock voltage

1. Remove R516, F501, R518 and R524 (all on component side).
2. Remove PCB from chassis.
3. Transmit and check voltage at [CV] point.
4. Adjust of voltage can be done by tuning TC402.

## Transmitter Section

Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test equipment	Terminal	Parts	Method	
1. Frequency	1) CH : TX center 2) Transmit	Frequency counter	ANT	Encoder knob	Adjust to center frequency	Within ±50Hz
2. Maximum power alignment	1) CH : TX high 2) Adjustment HEX value : FF 3) Transmit	Power meter		VR601	55W	±1W
	1) CH : TX low CH : TX low' CH : TX center CH : TX high' CH : TX high 2) Transmit			Encoder knob	Low : 50W Low' : 60W Center : 60W High' : 50W High : 50W	±1.0W
4. Low power	1) CH : TX low CH : TX low' CH : TX center CH : TX high' CH : TX high 2) Transmit	Modulation analyzer or Linear detector (LPF : 3kHz) Oscilloscope			25W	±1.0W
5. DCS balance	1) CH : TX low (Wide) CH : TC center (Wide/Narrow) CH : TX high (Wide) 2) Transmit				Adjust the waveform as below	



## ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test equipment	Terminal	Parts	Method	
6. MAX deviation	1) CH : TX low (Wide) CH : TX center (Wide/Narrow) CH : TX high (Wide) 2) AG : 1kHz/50mV 3) Transmit	Modulation analyzer or Linear detector (LPF : 15kHz) Oscilloscope AG AF V.M	ANT MIC	Encoder knob	±4.0kHz (Wide) ±2.0kHz (Narrow) According to the large +, -	±100Hz (Wide) ±50Hz (Narrow)
7. MIC sensitivity	1) CH : TX center (Narrow) 2) AG : 1kHz/5.4mV (TM-271A) AG : 1kHz/2.4mV (TM-271E) 3) Transmit				Check	±1.2~1.9kHz (Narrow)
8. CTCSS fine deviation	1) CH : TX low (Wide) CH : TX center (Wide/Narrow) CH : TX high (Wide) 2) Transmit	Modulation analyzer or Linear detector (LPF : 3kHz) Oscilloscope		Encoder knob	±0.75kHz (Wide) ±0.35kHz (Narrow)	±50Hz
9. DCS fine deviation	1) CH : TX low (Wide) CH : TX center (Wide/Narrow) CH : TX high (Wide) 2) Transmit				±0.75kHz (Wide) ±0.35kHz (Narrow)	±50Hz (Wide) ±40Hz (Narrow)
10. DTMF fine deviation	1) CH : TX center (Wide/Narrow) 2) Transmit				±3.0kHz (Wide) ±1.5kHz (Narrow)	±200Hz (Wide) ±100Hz (Narrow)

**If normal power is not obtained, please follow the step below**

Open the shielding cover (upper), and screw 3 locations around ANT pin.

1. Switch off the transceiver.

Impedance of Final FET (Q504) and Drive FET (Q503) can be measured easily using DVM  $\Omega$  mode.

Normal condition – Gate :  $20k\Omega$ ~ $50k\Omega$ , Drain :  $1M\Omega$ ~ $2M\Omega$   
The above impedance values are rough estimations.

2. Switch on the transceiver. Check the voltage at F501 output point.

The voltage is around 13.8V in receiving condition. The voltage will be 12.6V~ in transmitting condition. If found 0V at this point then F501 is broken.

3. Remove R516.

4. Connect  $50\Omega$  load at the ANT location. Transmit and check current drain at High power mode. If the current drain is less than 1A, then Final FET is broken. If the current drain is less than 5.0A, short the Drive FET gate to ground, and check the current drain. If the current drain is not 0.1A less than the original value, then the Drive FET is broken.
5. Check input power level at Drive FET gate location. Connect the wire to [RF] location. Transmit and check for power to be within the range of 0.3W~0.6W. If power found is less than 0.3W, check the circuit before the Drive FET.

## Receiver Section

Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test equipment	Terminal	Parts	Method	
1. Band pass tuning	1) CH : RX low (Wide) CH : RX center (Wide/Narrow) CH : RX high (Wide) 2) SSG output : $-121dBm$ ( $0.2\mu V$ ) (Wide) : $-119dBm$ ( $0.25\mu V$ ) (Narrow) Mod : 1kHz Dev : $\pm 3.0kHz$ (Wide) Dev : $\pm 1.5kHz$ (Narrow)	SSG Oscilloscope AF V.M Distortion meter	ANT EXT. SP	Encoder knob	Adjust to maximum SINAD.	SINAD : 12dB or higher

## ADJUSTMENT

Item	Condition	Measurement		Adjustment		Specifications/ Remarks
		Test equipment	Terminal	Parts	Method	
2. Squelch tight	1) CH : RX low (Wide) CH : RX center (Wide/Narrow) CH : RX high (Wide) 2) SSG output : -115dBm (0.4μV) (Wide/Narrow) Mod : 1kHz Dev : ±3.0kHz (Wide) Dev : ±1.5kHz (Narrow)	SSG Oscilloscope AF V.M Distortion meter	ANT EXT. SP	Encoder knob	Adjust to open the squelch	
3. Squelch open	1) CH : RX low (Wide) CH : RX center (Wide/Narrow) CH : RX high (Wide) 2) SSG output : -125dBm (0.126μV) (Wide/Narrow) Mod : 1kHz Dev : ±3.0kHz (Wide) Dev : ±1.5kHz (Narrow)					
4. RSSI writing	1) CH : RX center (Wide) 2) SSG output : -53dBm (501μV) Mod : 1kHz Dev : ±3.0kHz			Push encoder knob	RSSI value writing is performed by the "Squelch open" item (center wide). SSG output level is changed and adjusted after SQ adjustment. This adjustment should not turn the encoder.	
5. S-meter S1	1) CH : RX center (Wide) 2) SSG output : -118dBm (0.28μV) Mod : 1kHz Dev : ±3.0kHz					
6. S-meter full scale	1) CH : RX center (Wide) 2) SSG output : -96dBm (3.54μV) Mod : 1kHz Dev : ±3.0kHz					

## TERMINAL FUNCTION

## TX-RX UNIT (X57-685X-XX)

CN No.	Pin No.	Name	Function
CN1	1	ENC A	Encoder A
	2	CM	Microphone Key Check
	3	ENC B	Encoder B
	4	MIC KEY	Microphone Key
	5	DI	Data Out from LCD
	6	CE	Chip Enable for LCD
	7	CL	Clock for LCD
	8	DO	Data transfer to LCD
	9	5C	5V DC power supply
	10	8C	8V DC supply
	11	VOL	Volume
	12	POWER	Power Key
	13	RXD	RXD
	14	BRI	Brightness Control
	15	PTT	PTT
	16	GND	Ground
	17	GND	Ground
	18	MIC	Microphone
CN2	1	GND	Ground
	2	SQC	Squelch Signal
	3	PKS	Transmission Control
	4	PR1	1200bps Receive Data
	5	PR9	9600bps Receive Data
	6	GND	Ground
	7	PKD	Transmission Modulation

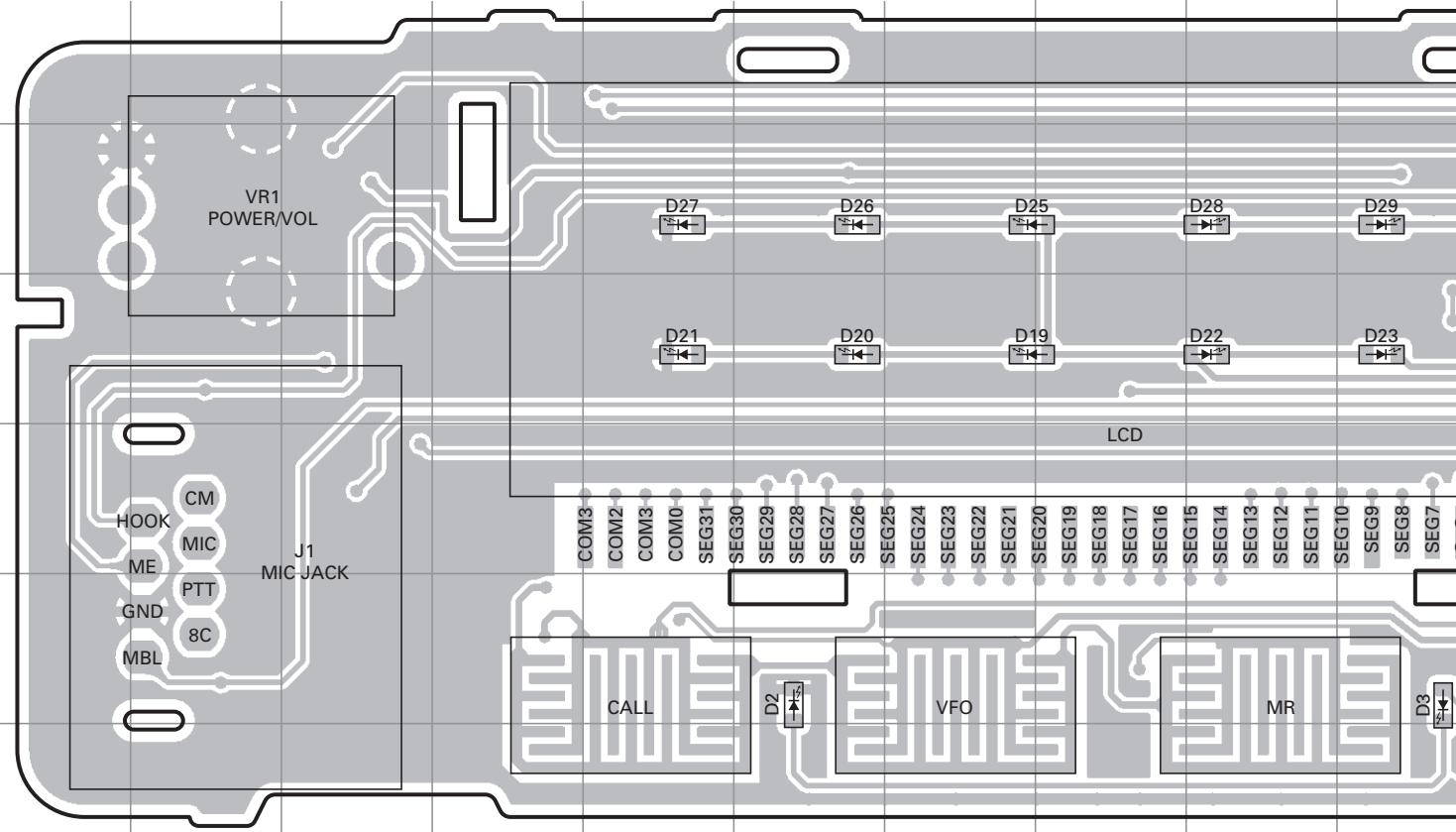
CN No.	Pin No.	Name	Function
CN5	1	INT SP	Internal speaker
	2	GND	Ground

## DISPLAY UNIT (X54-3450-10)

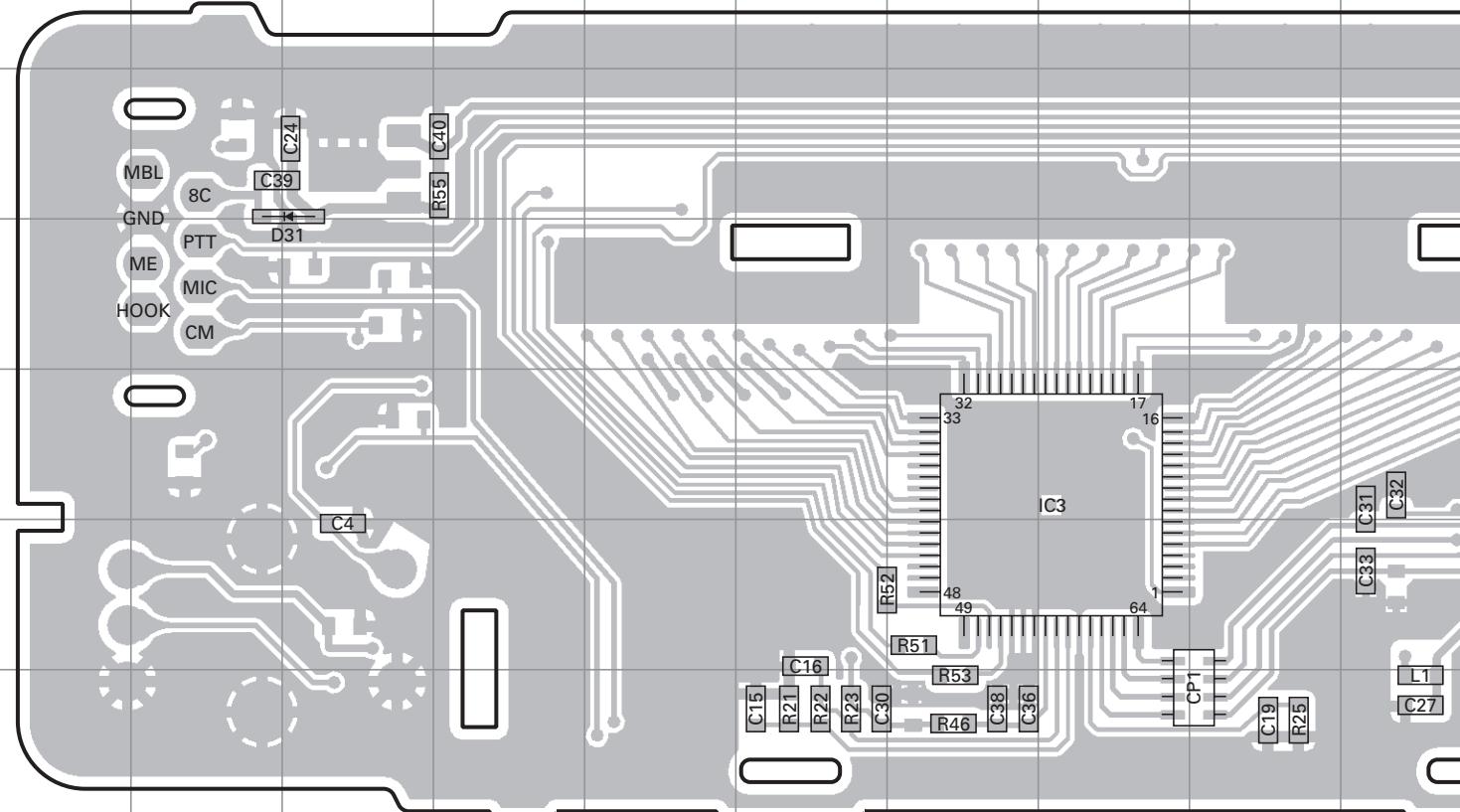
CN No.	Pin No.	Name	Function
CN1	1	ENC A	Encoder A
	2	CM	Microphone Key Check
	3	ENC B	Encoder B
	4	MIC KEY	Microphone Key
	5	DI	Data Out from LCD
	6	CE	Chip Enable for LCD
	7	CL	Clock for LCD
	8	DO	Data transfer to LCD
	9	5C	5V DC power supply
	10	8C	8V DC supply
	11	VOL	Volume
	12	POWER	Power Key
	13	RXD	RXD
	14	BRI	Brightness Control
	15	PTT	PTT
	16	GND	Ground
	17	ME	ME
	18	MIC	Microphone

# TM-271A/271E PC BOARD

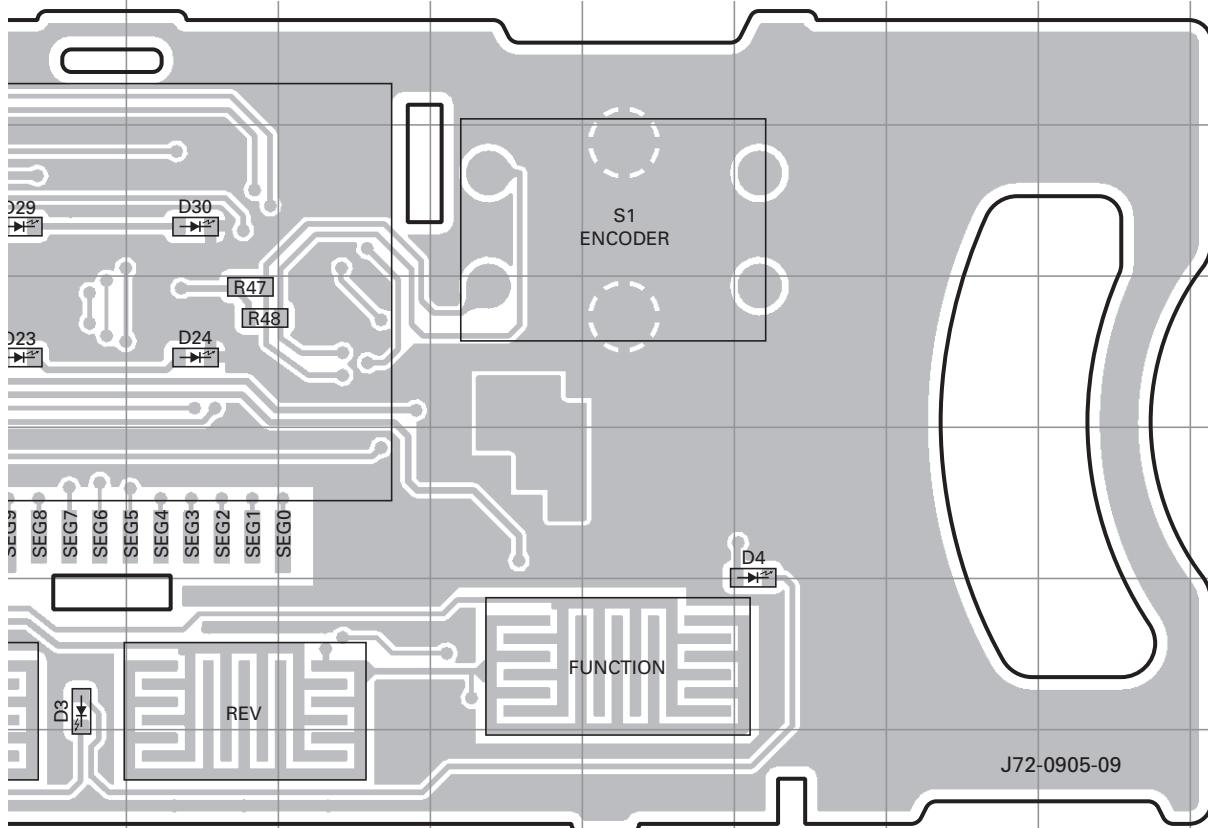
## DISPLAY UNIT (X54-3450-10) Component side view (J72-0905-09)



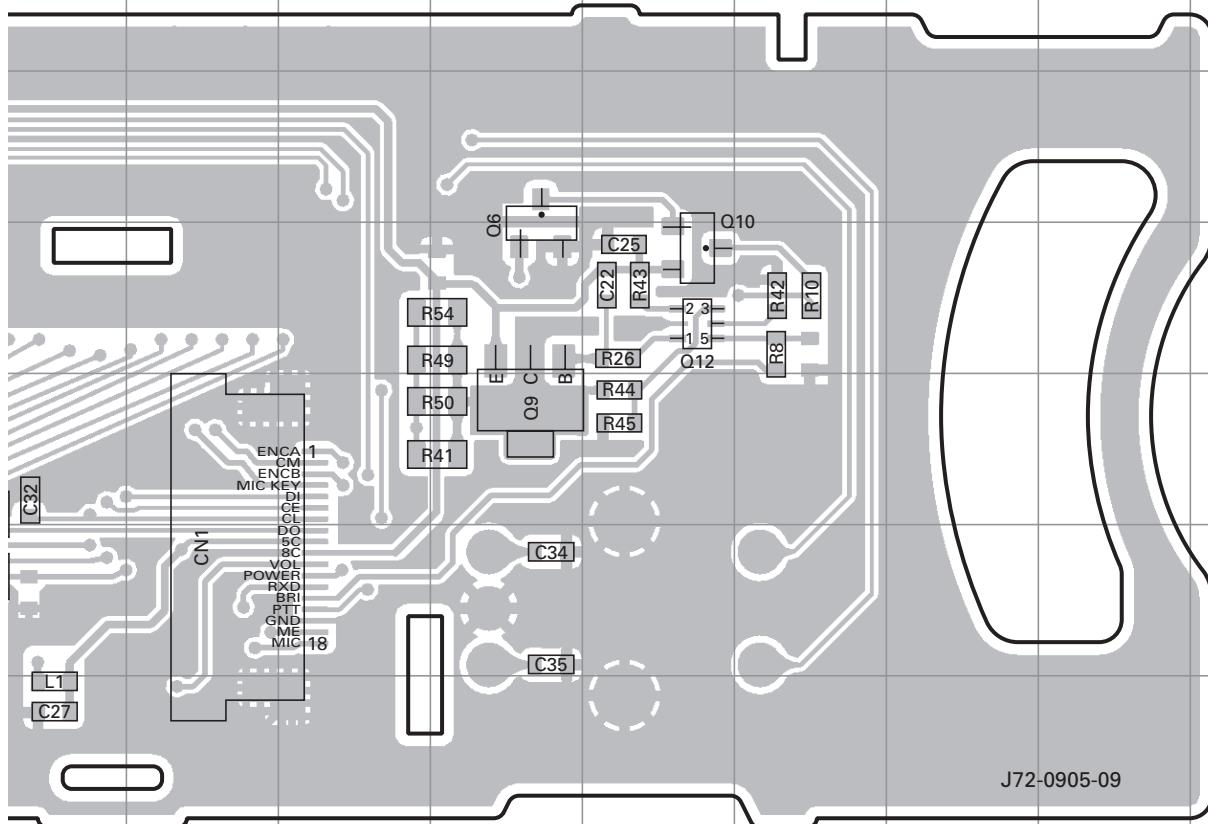
## DISPLAY UNIT (X54-3450-10) Foil side view (J72-0905-09)



▼ DISPLAY UNIT (X54-3450-10) Component side view (J72-0905-09)



DISPLAY UNIT (X54-3450-10) Foil side view (J72-0905-09)



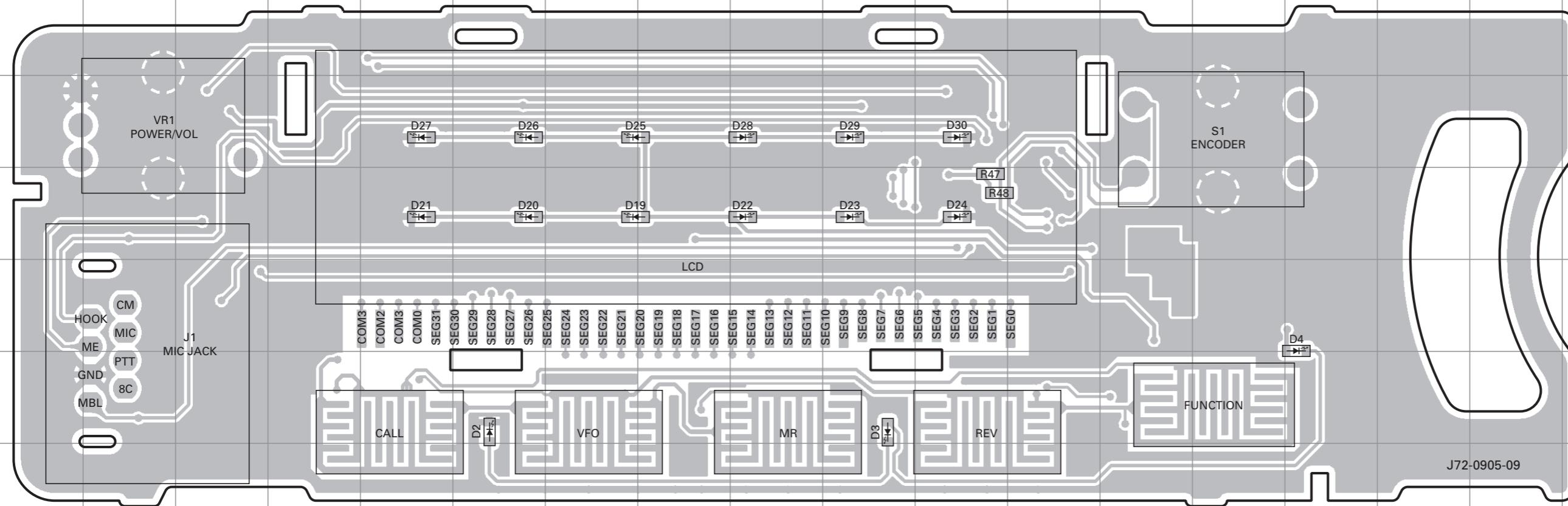
# TM-271A/271E PC BOARD

# PC BOARD

# TM-271A/271E

DISPLAY UNIT (X54-3450-10) Component side view (J72-0905-09)

DISPLAY UNIT (X54-3450-10) Component side view (J72-0905-09)



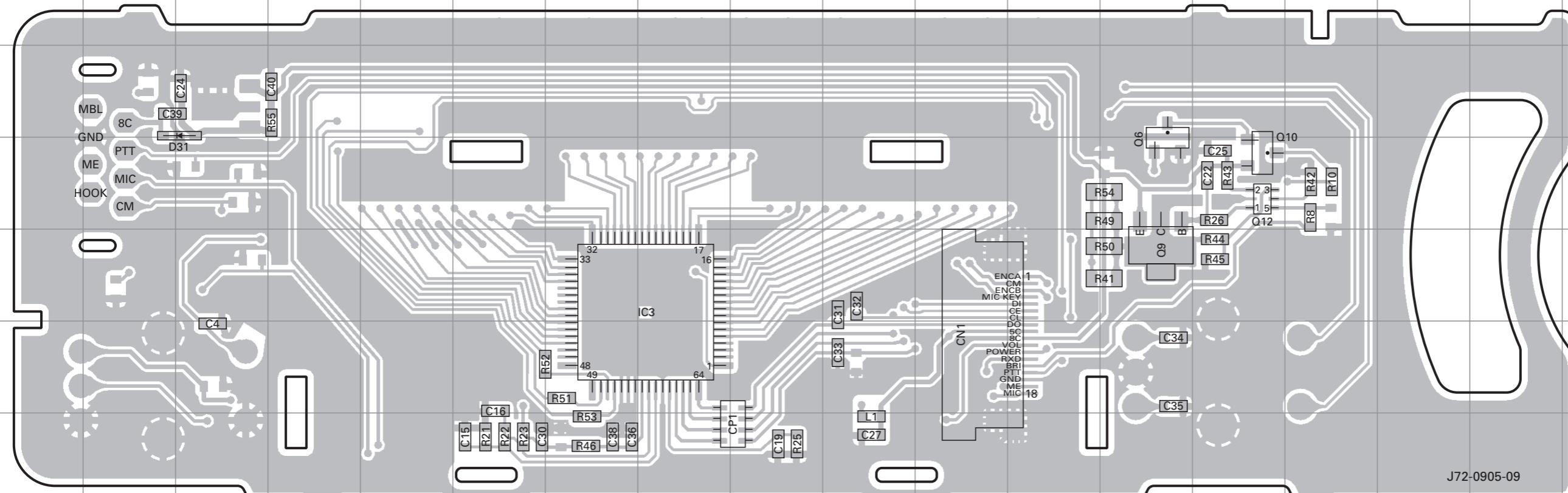
Ref. No.	Address
D2	6F
D3	6J
D4	5O
D19	4G
D20	4P
D21	4E
D22	4I
D23	4J
D24	4K
D25	3G
D26	3F
D27	3E
D28	3I
D29	3J
D30	3K

Component side  
Layer 1  
Layer 2  
Foil side

J72-0905-09

DISPLAY UNIT (X54-3450-10) Foil side view (J72-0905-09)

DISPLAY UNIT (X54-3450-10) Foil side view (J72-0905-09)



Ref. No.	Address
IC3	11H
Q6	10M
Q9	11M
Q10	10N
Q12	10N
D31	9C

Component side  
Layer 1  
Layer 2  
Foil side

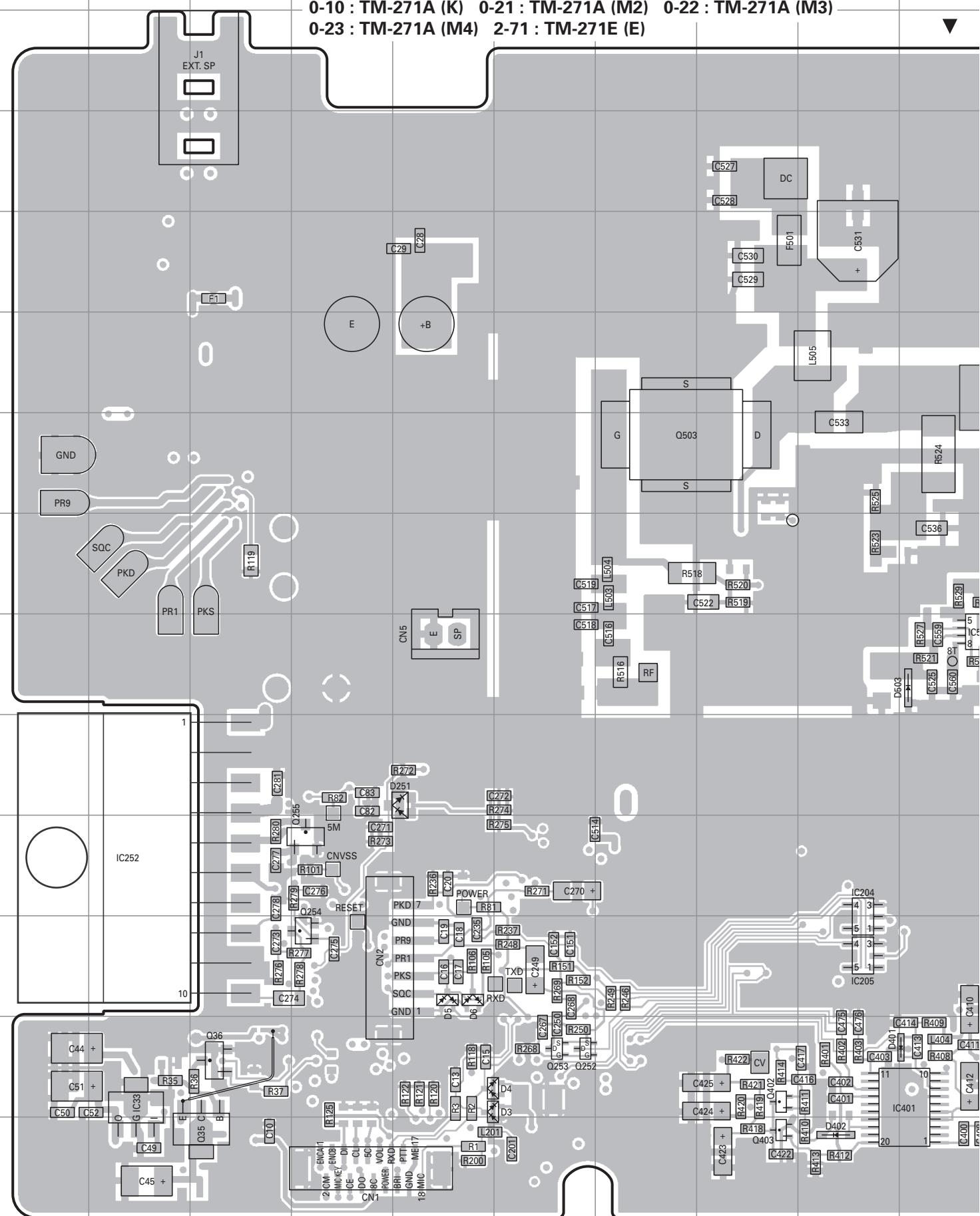
J72-0905-09

# TM-271A/271E PC BOARD

## **TX-RX UNIT (X57-685X-XX)**

## Component side view (J72-0906-09)

0-10 : TM-271A (K) 0-21 : TM-271A (M2) 0-22 : TM-271A (M3)  
0-23 : TM-271A (M4) 2-71 : TM-271E (E)

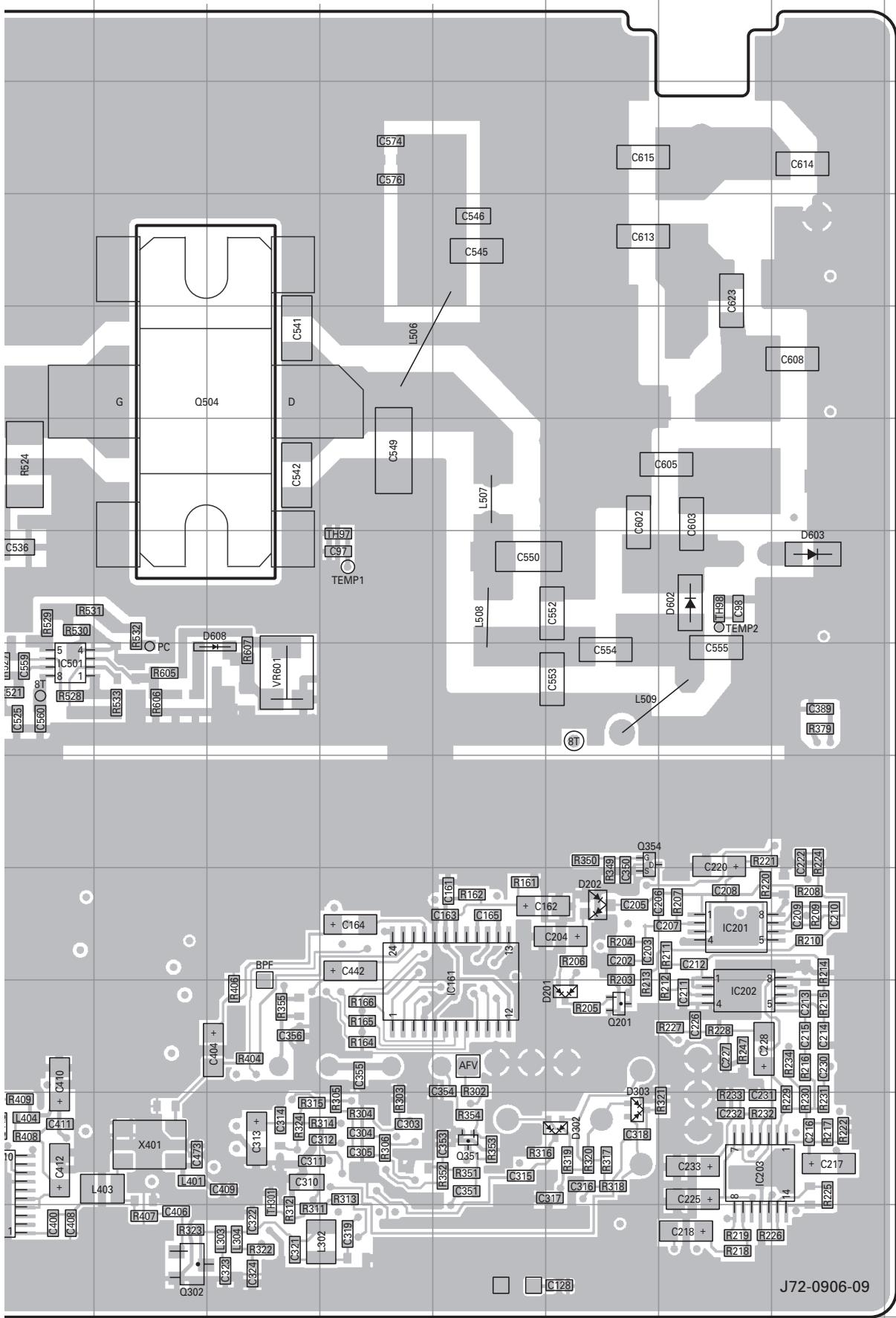


**PC BOARD** TM-271A/271E

**TX-RX UNIT (X57-685X-XX) Component side view (J72-0906-09)**

0-10 : TM-271A (K) 0-21 : TM-271A (M2) 0-22 : TM-271A (M3)

0-23 : TM-271A (M4) 2-71 : TM-271E (E)



Ref. No.	Address
IC33	12B
IC161	1N
IC201	10P
IC202	11P
IC203	12P
IC204	10I
IC205	11I
IC252	10B
IC401	12J
IC501	8J
Q35	13C
Q36	12C
Q201	11O
Q252	12F
Q253	12F
Q254	11D
Q255	10D
Q302	13K
Q351	12N
Q354	9O
Q402	12H
Q403	13H
Q503	6G
Q504	5K
D3	12E
D4	12E
D5	11E
D6	11E
D201	11O
D202	10O
D251	9E
D302	12O
D303	12O
D401	12J
D402	13I
D503	8J
D602	7P
D603	7Q
D608	8L

### Component side

The diagram illustrates a vertical stack of four distinct layers. From top to bottom, the layers are: Layer 1 (gray), Layer 2 (white), Layer 3 (white), and Layer 4 (white). Each layer is represented by a rectangular box with a thin black border.

# TM-271A/271E PC BOARD

## TX-RX UNIT (X57-685X-XX)

Component side view (J72-0906-09)

11. *What is the primary purpose of the following sentence?*

0-10 : TM-271A (K) 0-21 : TM-271A (M2)

0-23 : TM-271A (M4) 2-71 : TM-271E (E)

Figure 1. A schematic diagram of the experimental setup for the two-photon absorption measurement.

For more information, contact the Office of the Vice President for Research and the Office of the Vice President for Student Affairs.

## PC BOARD

TM-271A/271E

**TX-RX UNIT (X57-685X-XX) Component side view (J72-0906-09)**

— 0-10 : TM-271A (K) 0-21 : TM-271A (M2) 0-22 : TM-271A (M3)

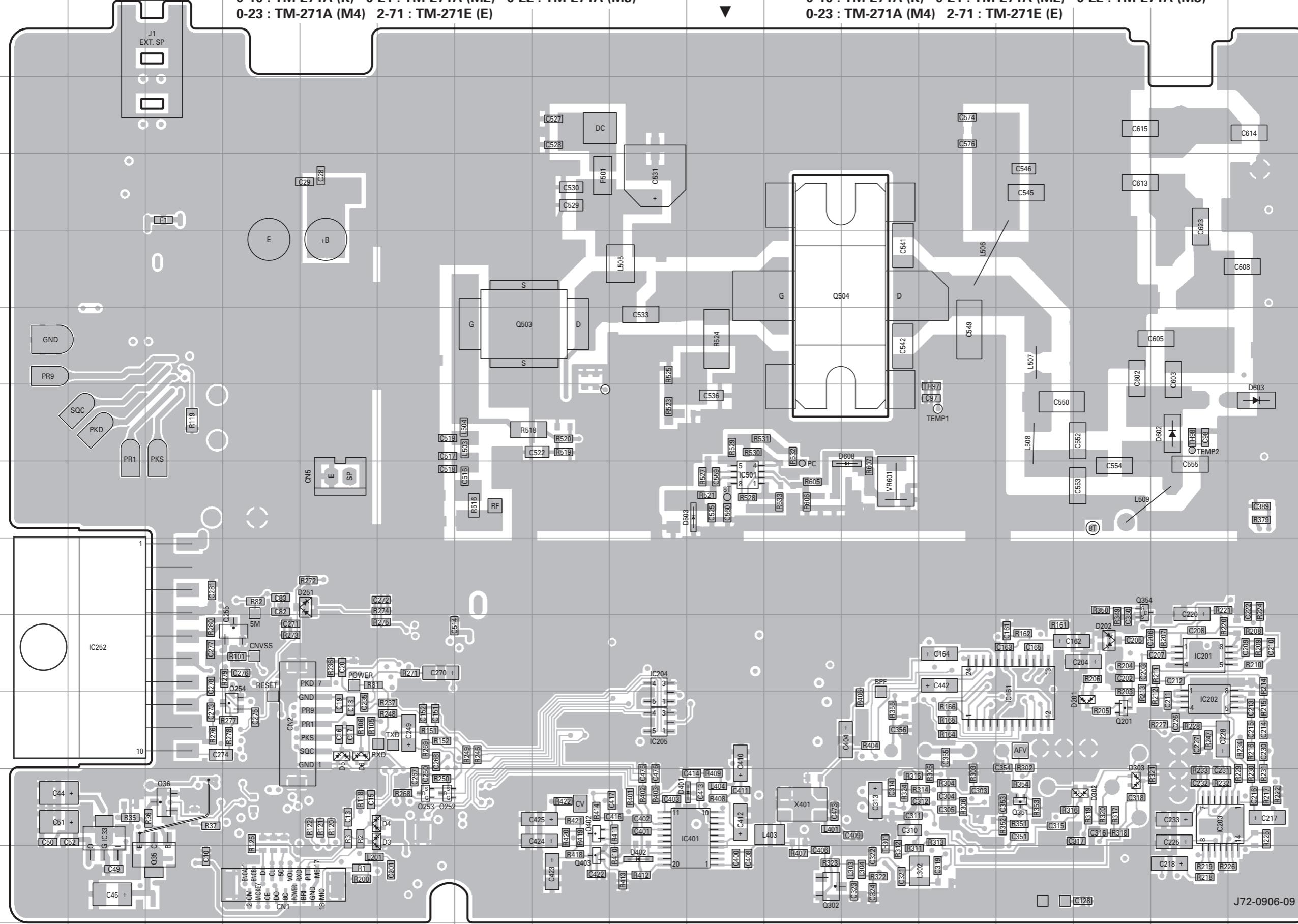
0-23 : TM-271A (M4) 2-71 : TM-271E (E) | |

Fig. 1. Schematic diagram of the experimental setup for the measurement of the thermal conductivity of the samples.

For more information, contact the Office of the Vice President for Research and the Office of the Vice President for Student Affairs.

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100%                                                                                                                                                                                                                                                            <img alt="checkmark icon" data-bbox="10625 938 10



Ref. No.	Address
IC33	12B
IC161	1N
IC201	10P
IC202	11P
IC203	12P
IC204	10I
IC205	11I
IC252	10B
IC401	12J
IC501	8J
Q35	13C
Q36	12C
Q201	11O
Q252	12F
Q253	12F
Q254	11D
Q255	10D
Q302	13K
Q351	12N
Q354	9O
Q402	12H
Q403	13H
Q503	6G
Q504	5K
D3	12E
D4	12E
D5	11E
D6	11E
D201	11O
D202	10O
D251	9E
D302	12O
D303	12O
D401	12J
D402	13I
D503	8J
D602	7P
D603	7Q
D608	8L

Component side

The diagram illustrates a neural network architecture with four layers. The layers are represented by horizontal rectangles of increasing width from left to right, indicating the progression from input to output. The first three layers are white, while the fourth layer is shaded gray, signifying the final output layer.

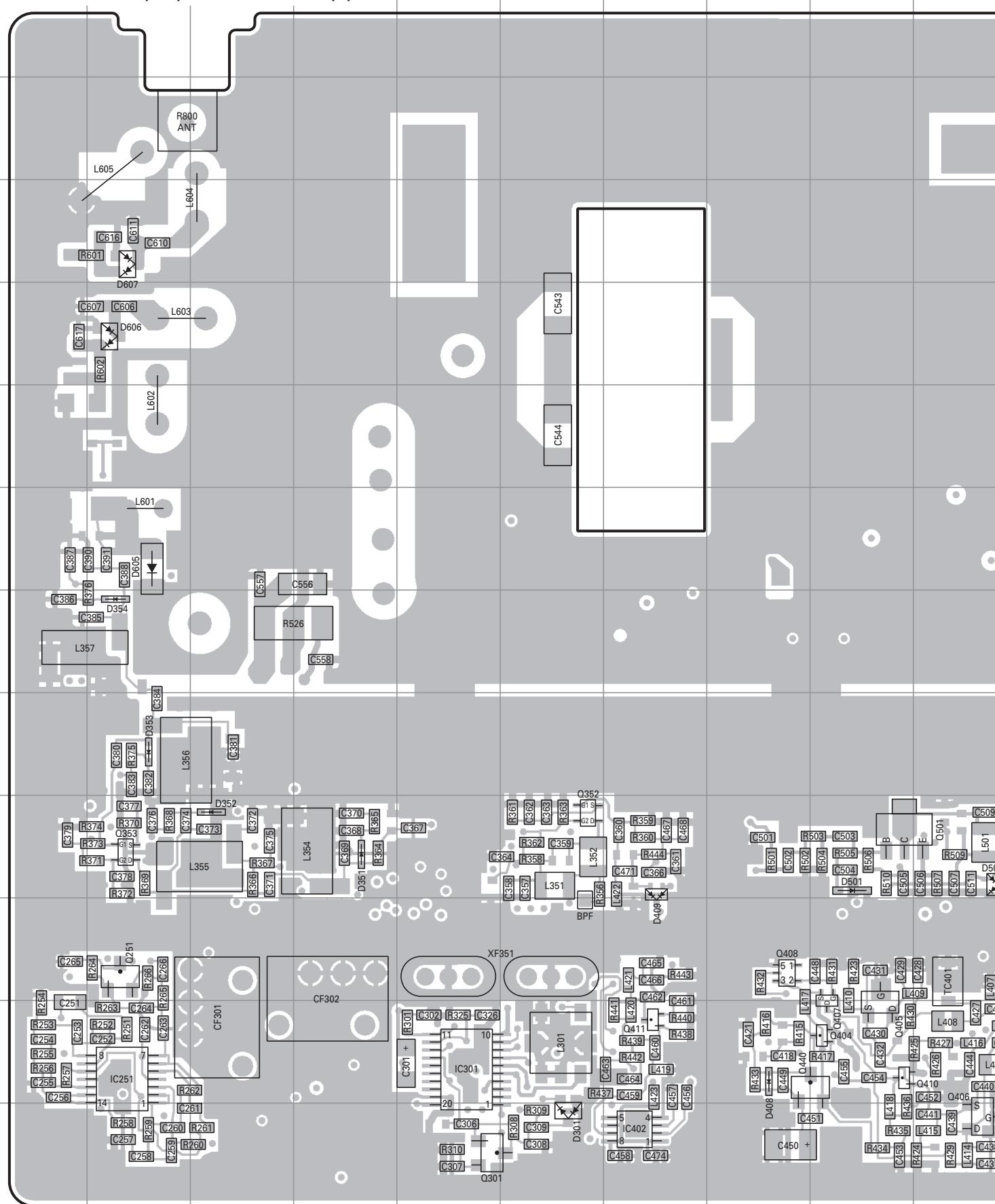
Layer 4

# TM-271A/271E PC BOARD

**TX-RX UNIT (X57-685X-XX) Foil side view (J72-0906-09)**

- 0-10 : TM-271A (K) 0-21 : TM-271A (M2) 0-22 : TM-271A (M3)

0-23 : TM-271A (M4) 2-71 : TM-271E (E)



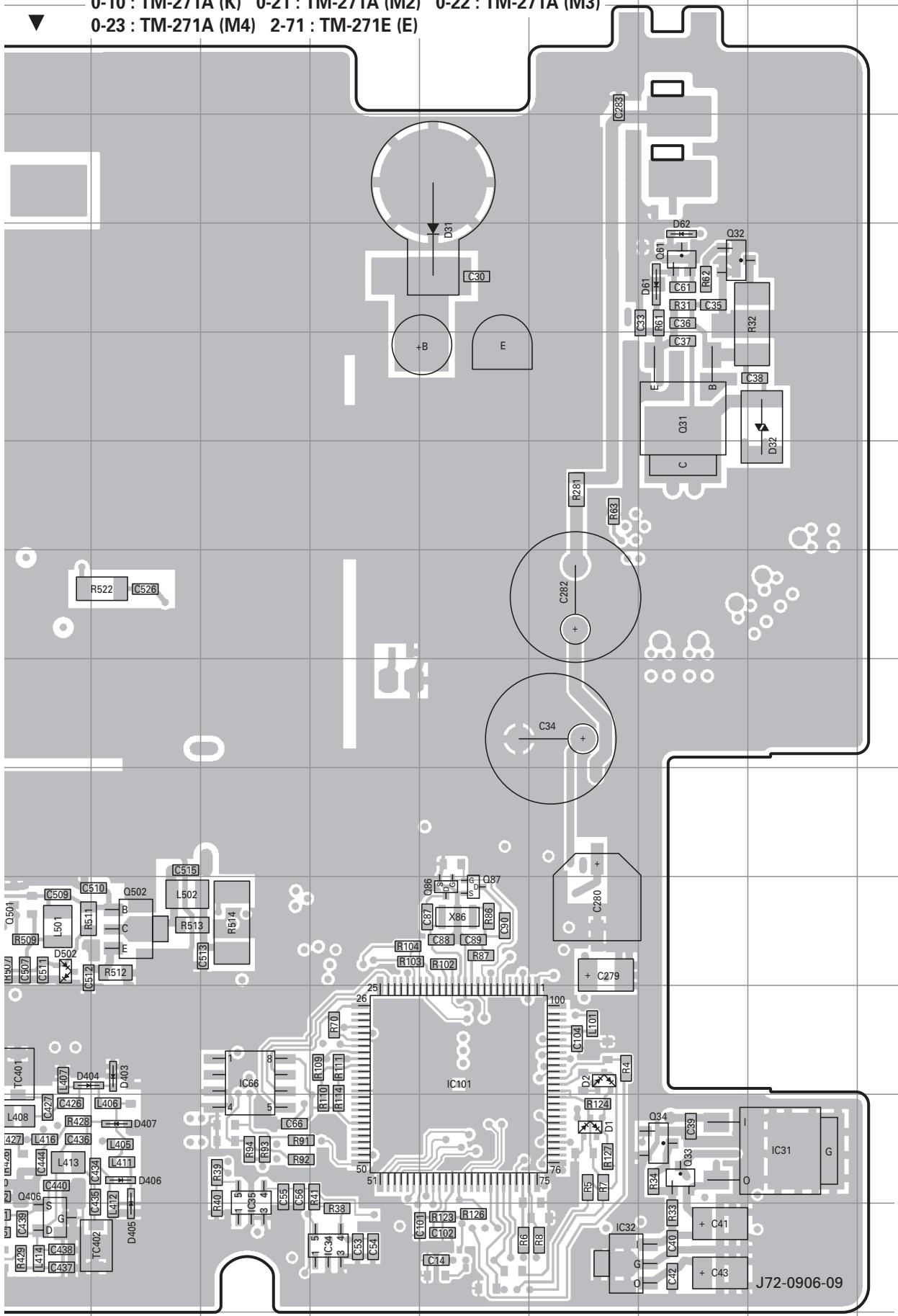
## PC BOARD

TM-271A/271E

**TX-RX UNIT (X57-685X-XX)      Foil side view (J72-0906-09)**

0-10 : TM-271A (K) 0-21 : TM-271A (M2) 0-22 : TM-271A (M3) -

0-23 : TM-271A (M4) 2-71 : TM-271E (E)



Ref. No.	Address
IC31	12Q
IC32	13O
IC34	13M
IC35	13L
IC66	11L
IC101	11N
IC251	12B
IC301	12E
IC402	13G
Q31	5P
Q32	4P
Q33	12P
Q34	12P
Q61	4P
Q86	10N
Q87	10N
Q251	11B
Q301	13E
Q352	10F
Q353	10B
Q404	12I
Q405	12I
Q406	13J
Q407	12I
Q408	11H
Q410	12I
Q411	12G
Q440	12H
Q501	10I
Q502	10K
D1	12O
D2	11O
D31	4N
D32	5Q
D61	4P
D62	4P
D301	13F
D351	10D
D352	10C
D353	9B
D354	8B
D403	11K
D404	11J
D405	13K
D406	12K
D407	12K
D408	12H
D409	10G
D501	10I
D502	10J
D605	7B
D606	5B
D607	4B

### Component side

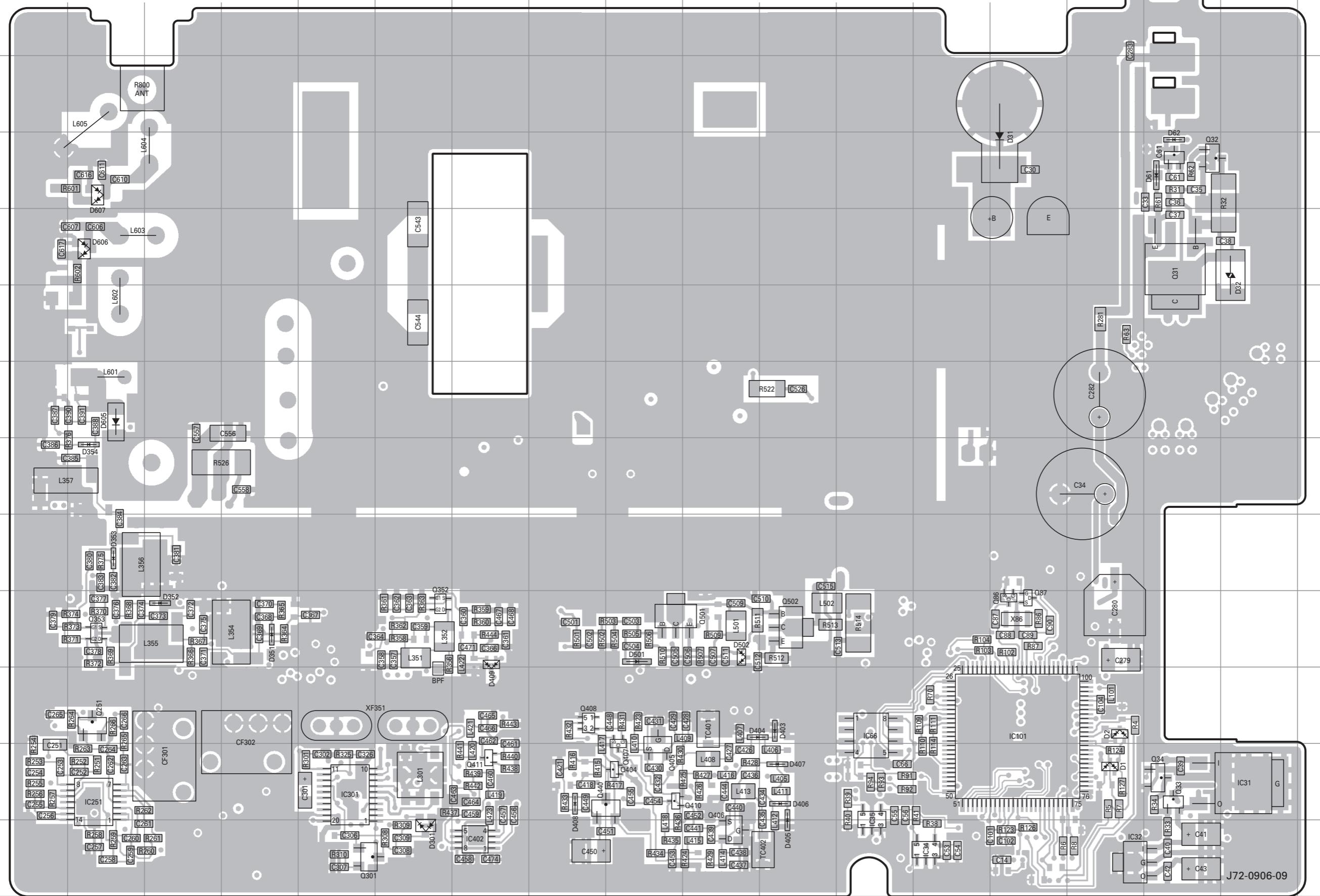
The diagram illustrates a neural network architecture with four layers. From left to right, the layers are labeled 'Layer 1', 'Layer 2', 'Layer 3', and 'Layer 4'. Layer 4 is distinguished by a gray shaded rectangular box around its entire area, while the other three layers are represented by white rectangular boxes.

# TM-271A/271E PC BOARD

TX-RX UNIT (X57-685X-XX) Foil side view (J72-0906-09)

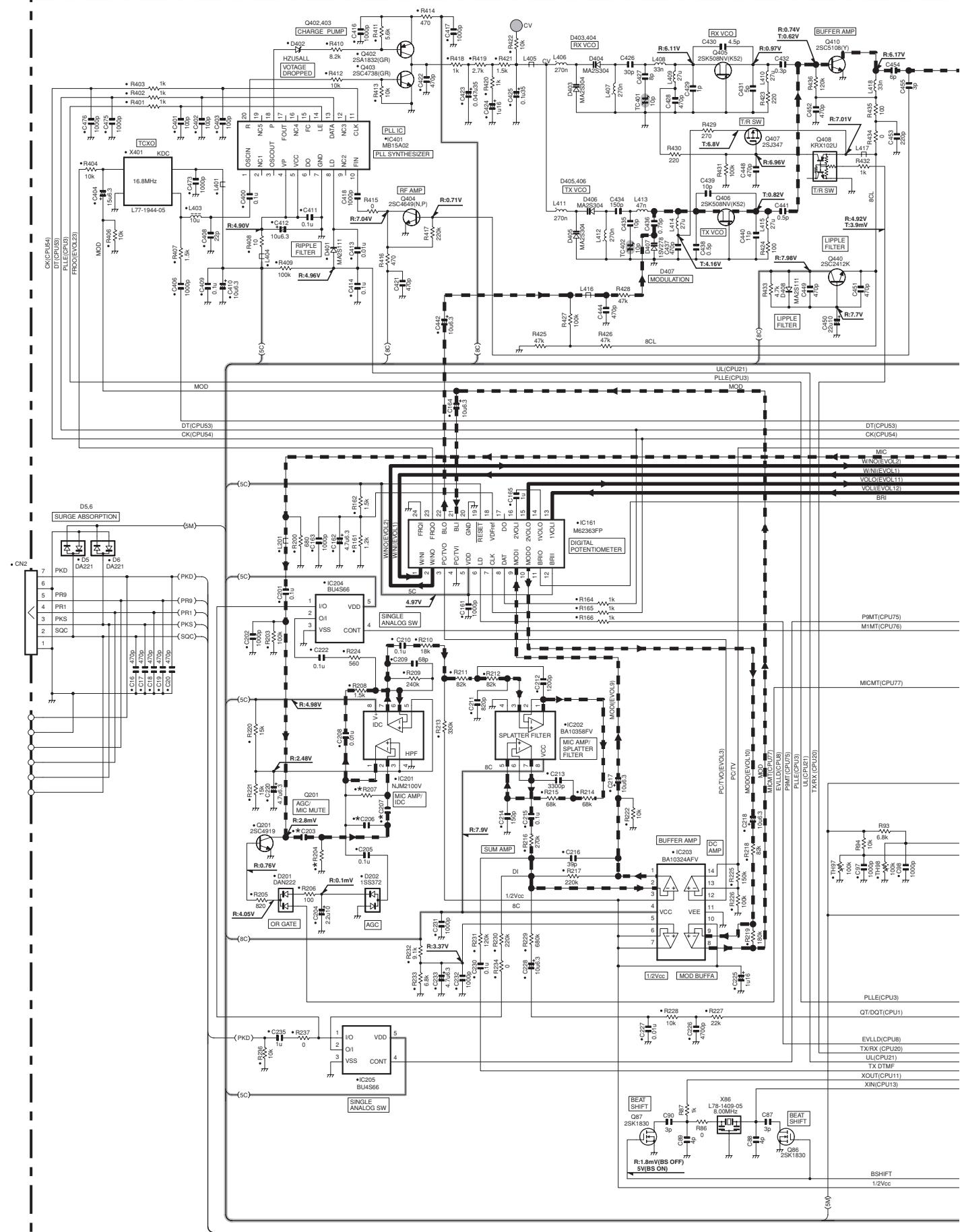
0-10 : TM-271A (K) 0-21 : TM-271A (M2) 0-22 : TM-271A (M3)

0-23 : TM-271A (M4) 2-71 : TM-271E (E)



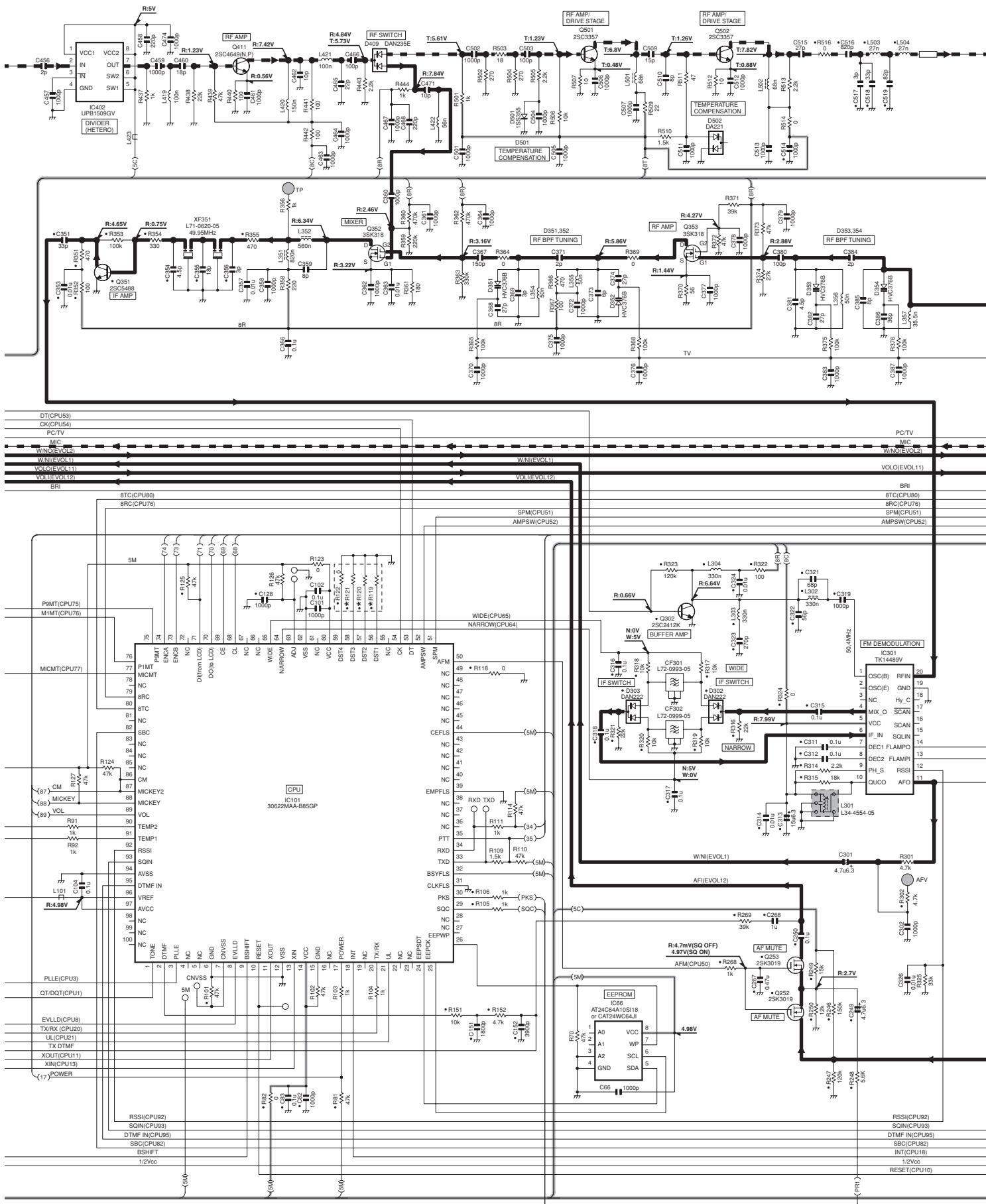
# TM-271A/271E SCHEMATIC DIAGRAM

TX-RX UNIT (X57-685X-XX)



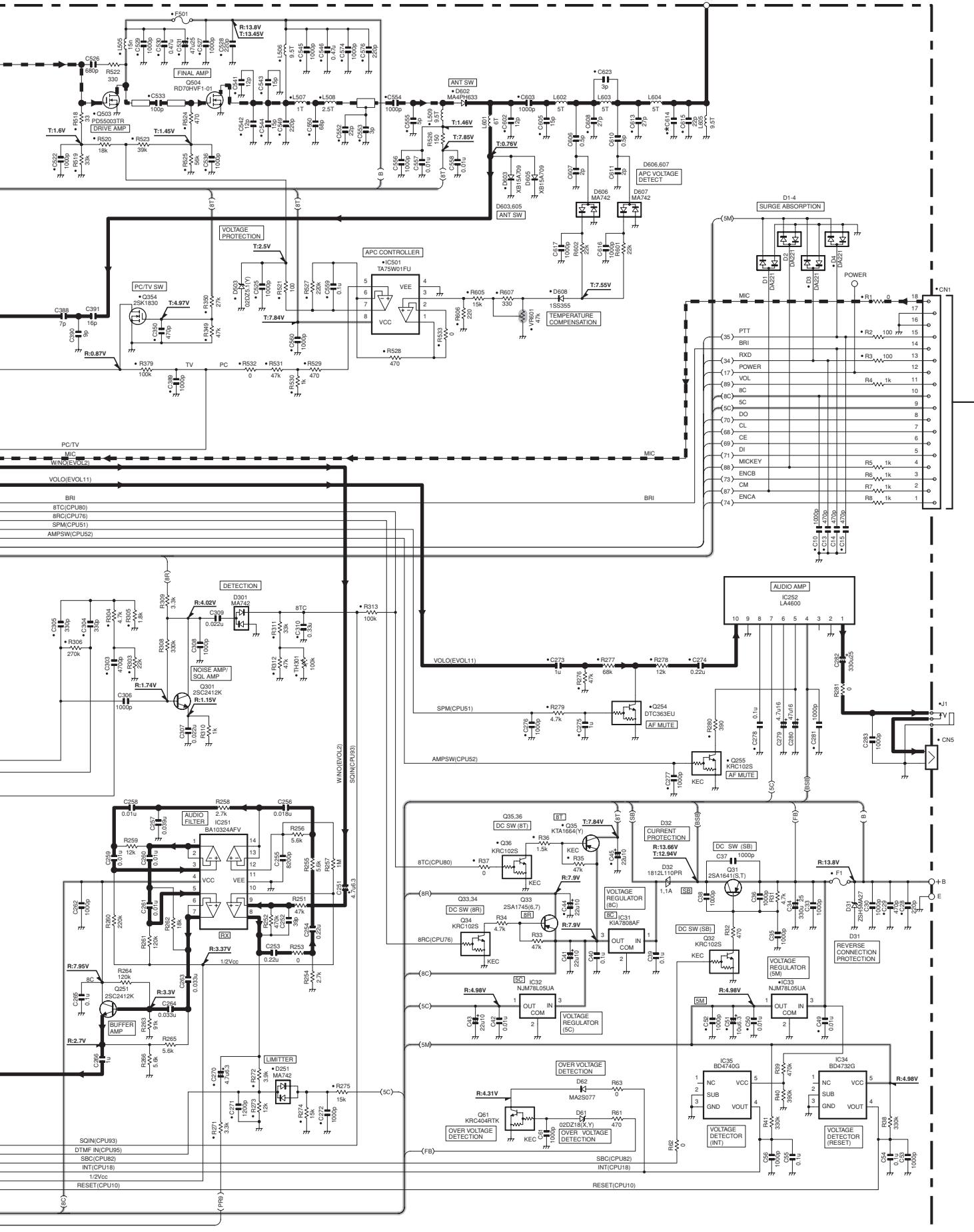
# SCHEMATIC DIAGRAM TM-271A/271E

## TX-RX UNIT (X57-685X-XX)



# TM-271A/271E SCHEMATIC DIAGRAM

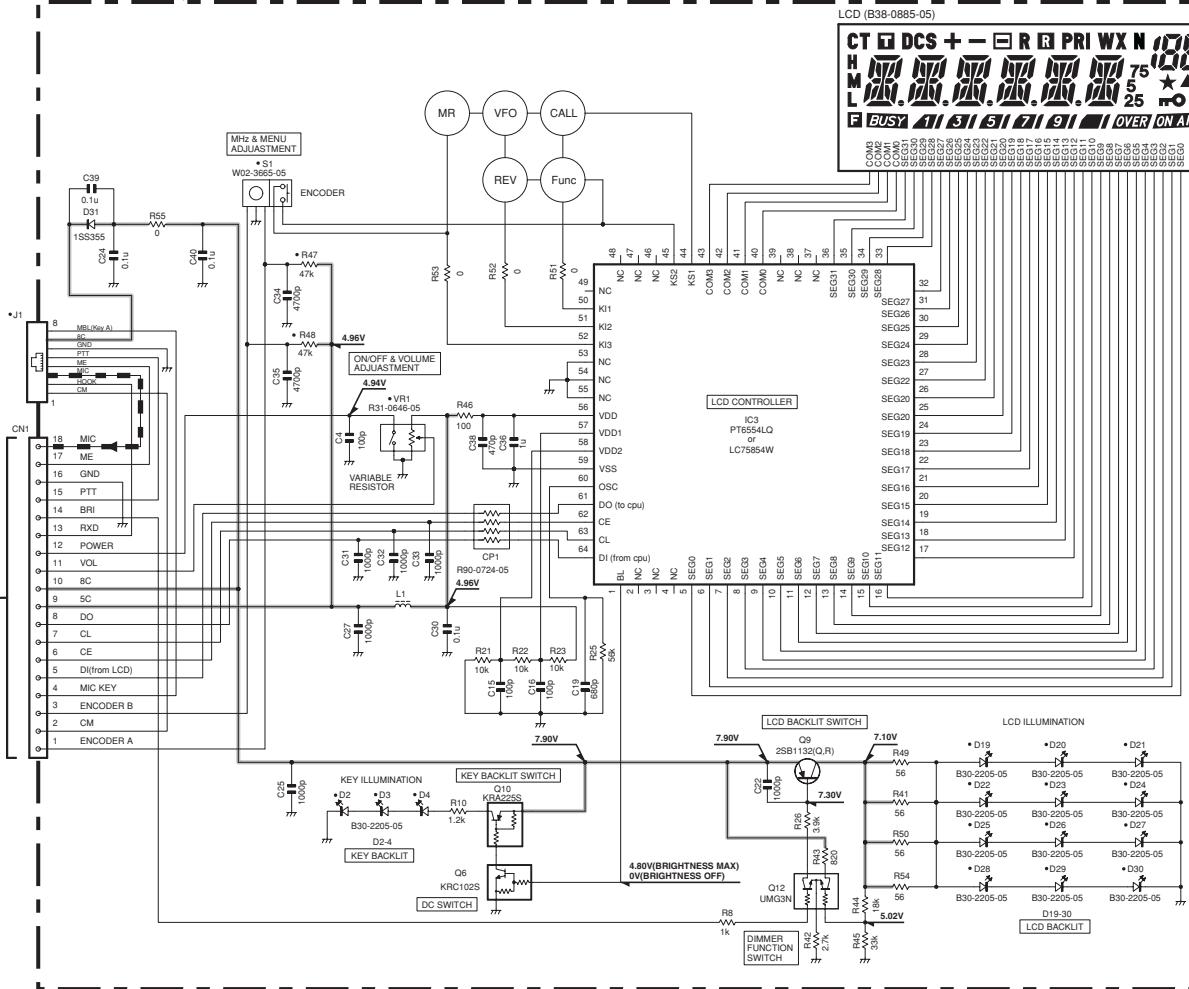
## TX-RX UNIT (X57-685X-XX)



## SCHEMATIC DIAGRAM

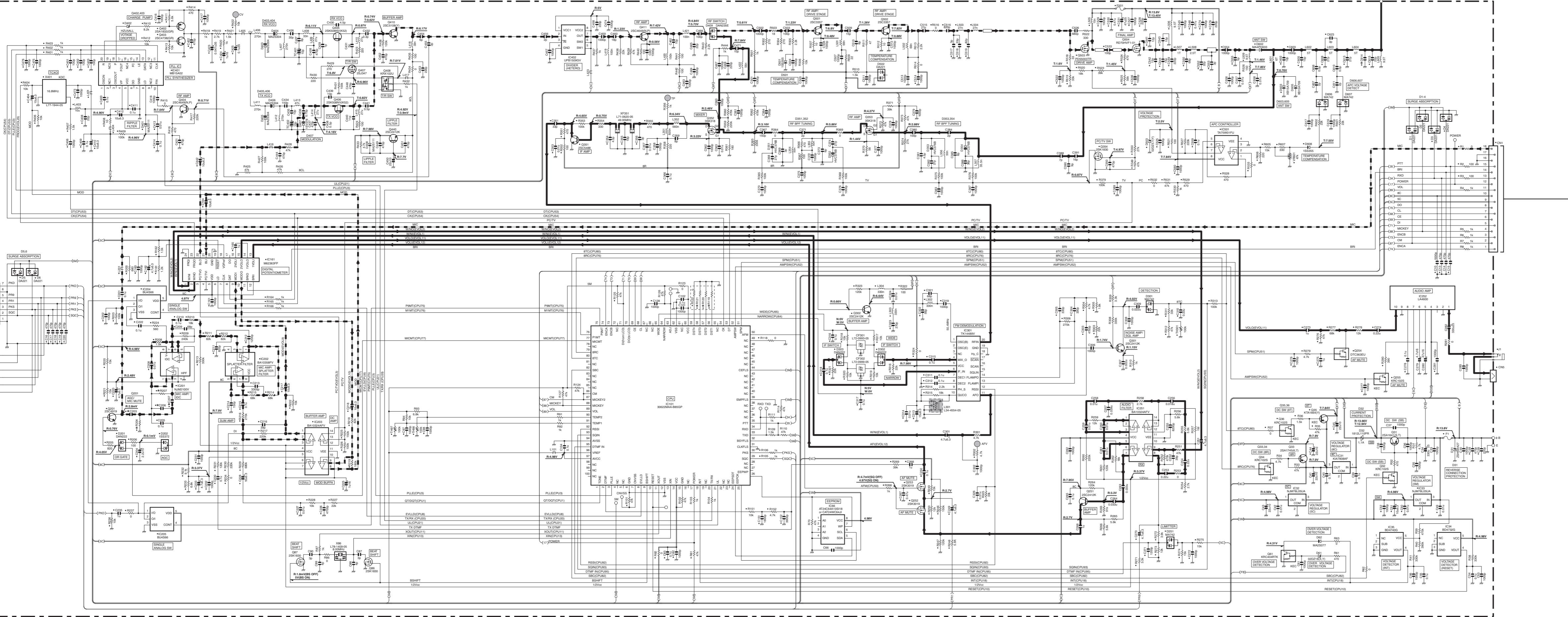
# TM-271A/271E

## DISPLAY UNIT (X54-3450-10)

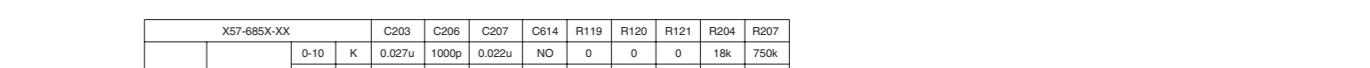
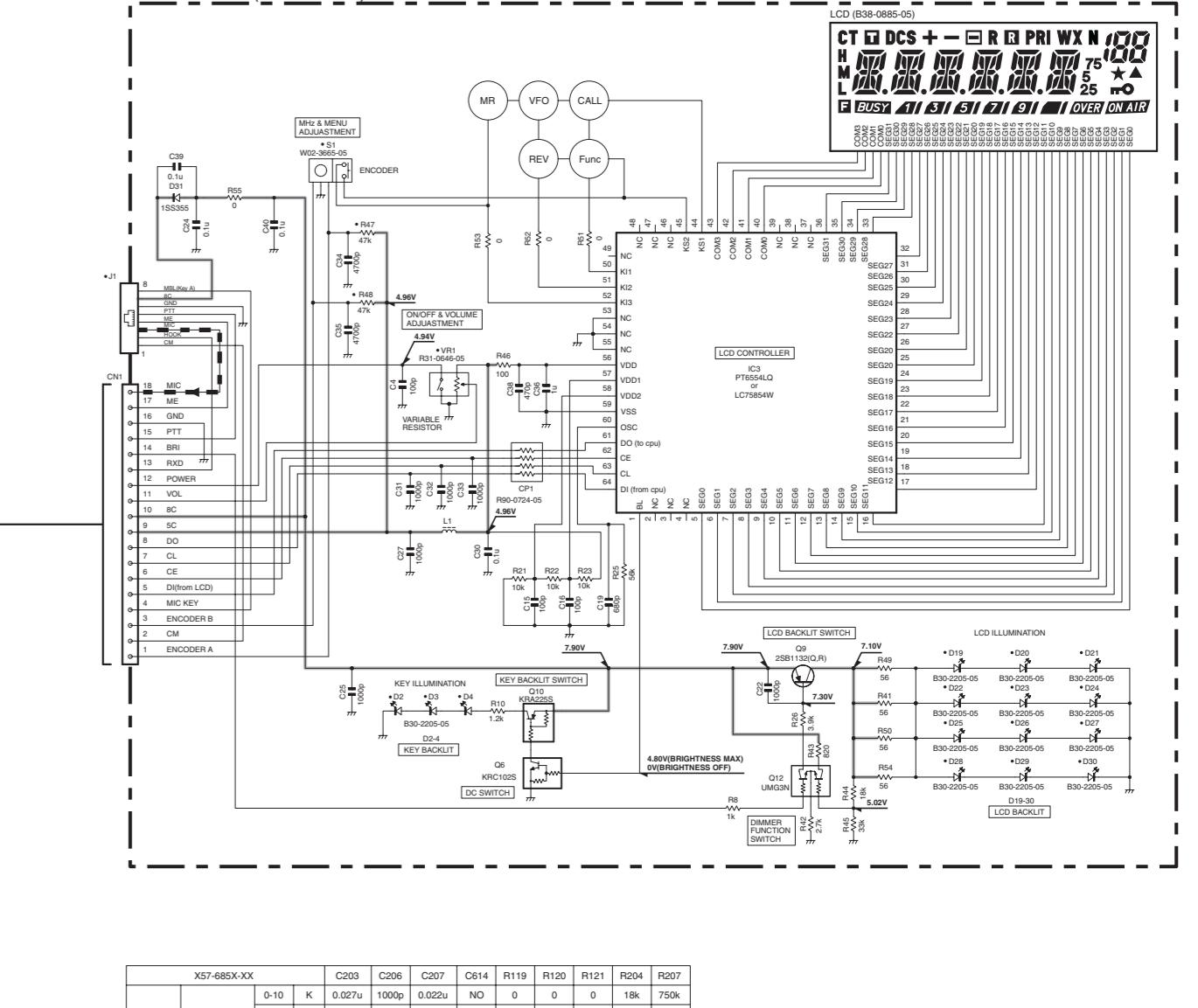


**Note :** The components marked with a dot (•) are parts of layer 1.

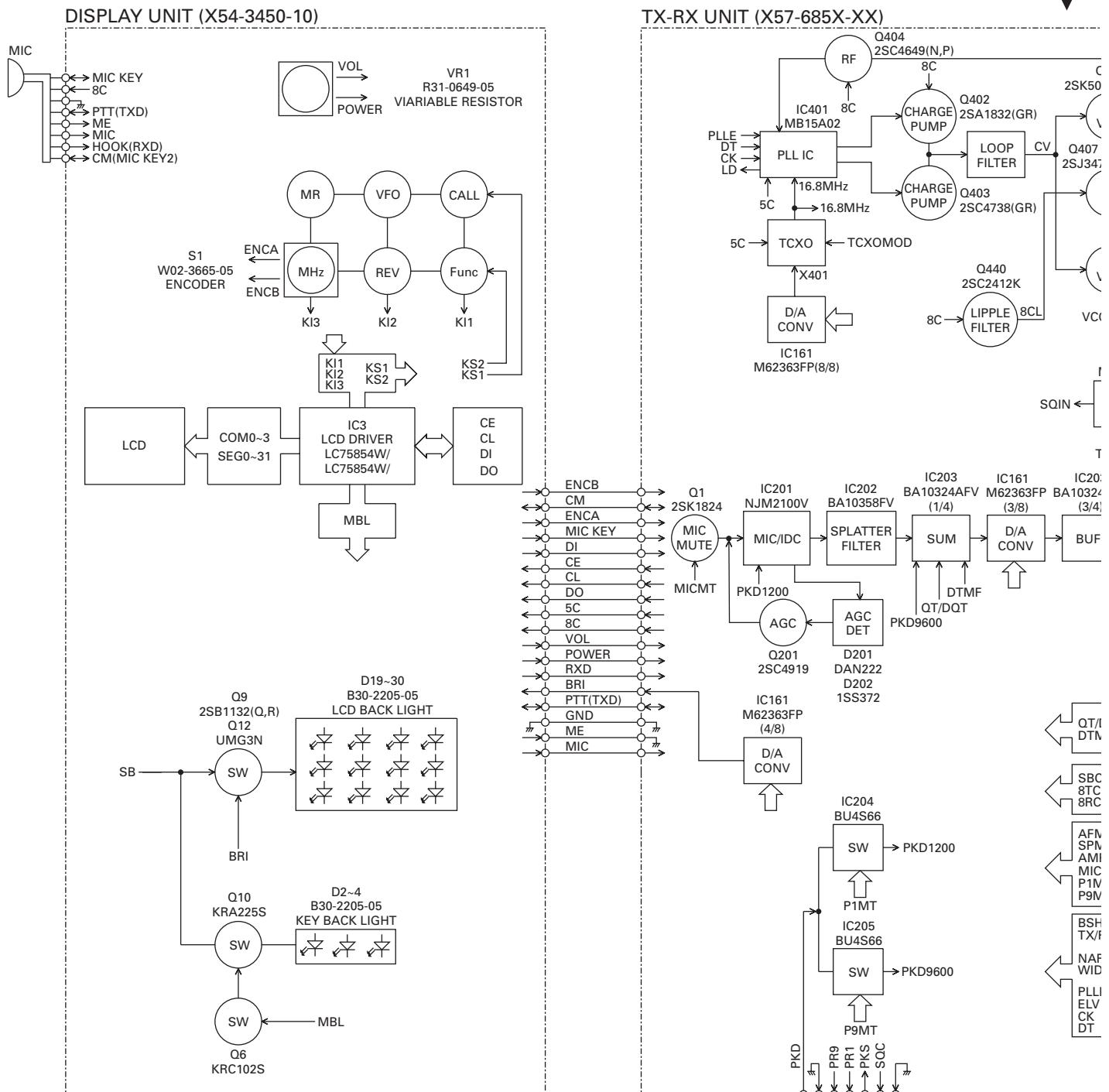
TX-RX UNIT (X57-685X-XX)



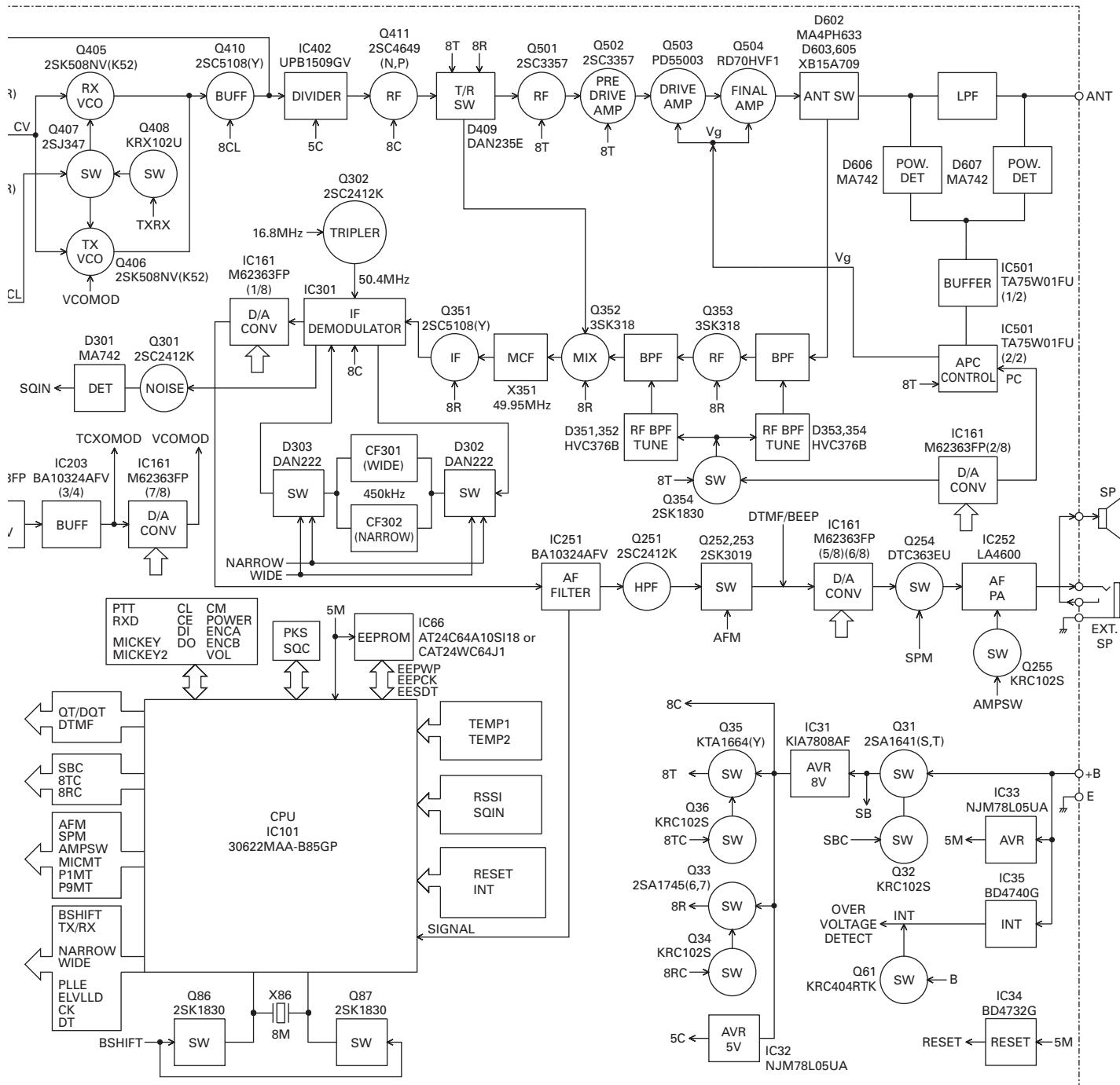
DISPLAY UNIT (X54-3450-10)



## BLOCK DIAGRAM

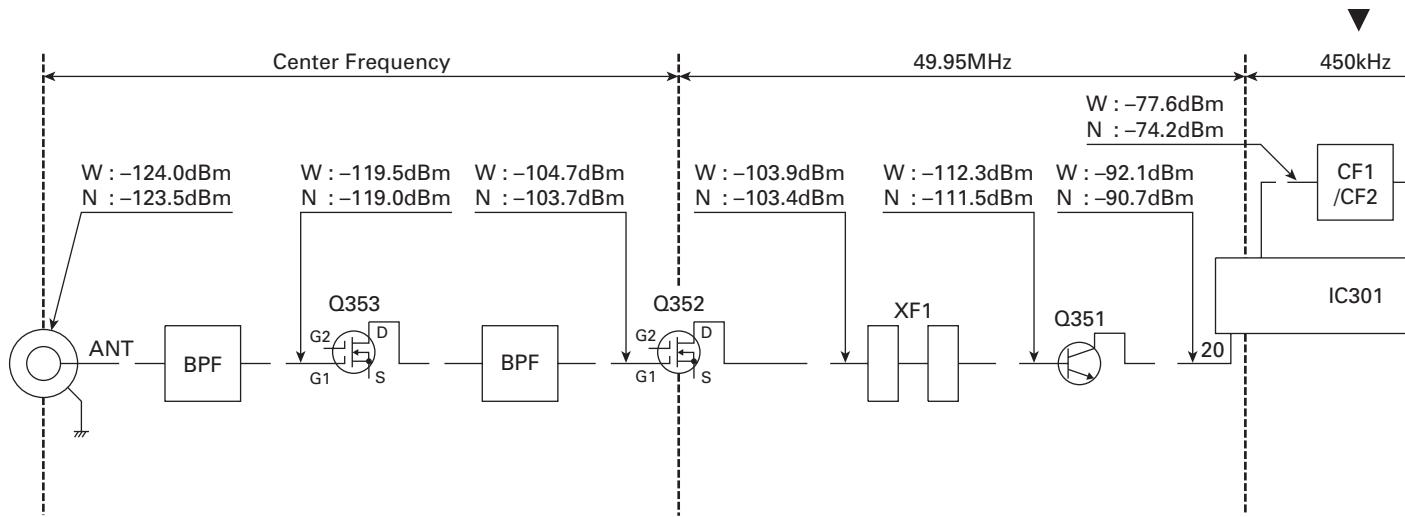


## BLOCK DIAGRAM



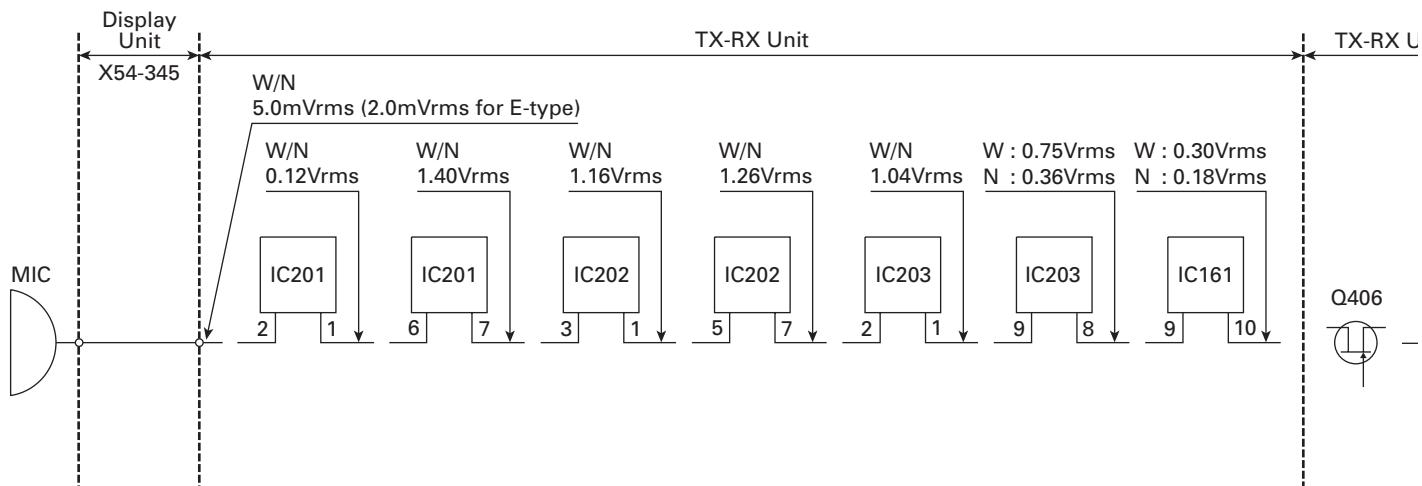
## LEVEL DIAGRAM

### Receiver Section



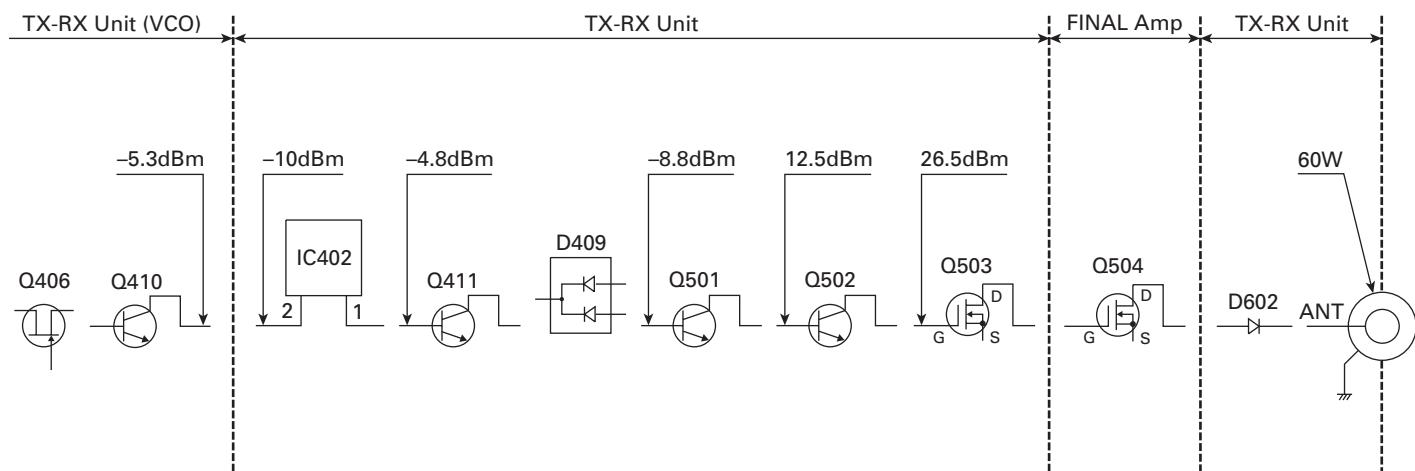
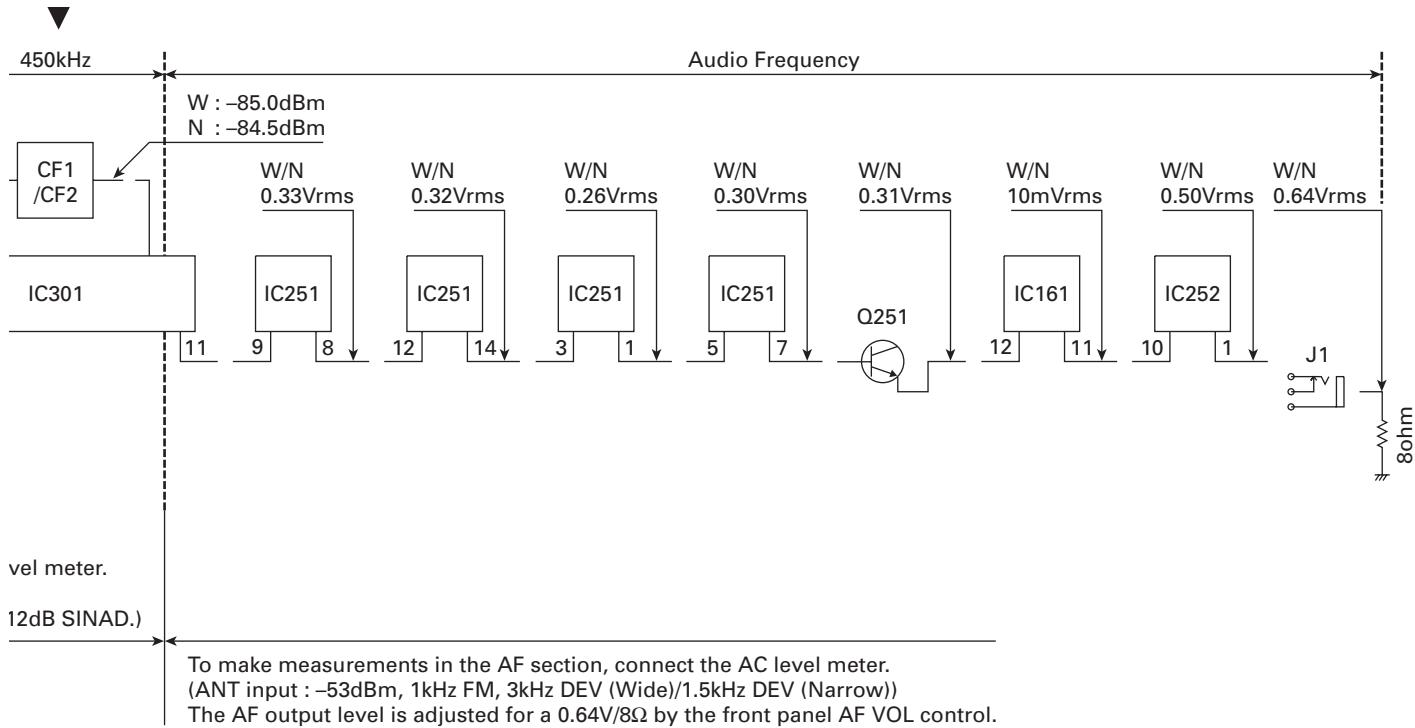
To make measurements in the RF section, connect the RF level meter.  
 In the RF section, use a  $0.01\mu\text{F}$  coupling capacitor.  
 (The display shows the SSG input value required to obtain 12dB SINAD)

### Transmitter Section



To make measurements in the AF section, connect the AC level meter.  
 AG is set so that MIC input becomes 3kHz/1.5kHz (Wide/Narrow) DEV at 1kHz MOD.

## LEVEL DIAGRAM



To make measurements in the RF section, connect the RF Wattmeter (50Ω).



# TM-271A/E

## SPECIFICATIONS

### GENERAL

#### Frequency Range

TX	.....	K,M4 : 144~148MHz	E : 144~146MHz	M2,M3 : 136~174MHz
RX	.....	K,E,M2,M3 : 136~174MHz	M4 : 144~148MHz	
Mode	.....	F3E (FM)		
Antenna Impedance	.....	50Ω		
Usable Temperature Range	.....	-20°C~+60°C (-4°F~+140°F)		
Power Supply	.....	13.8V DC±15% (11.7~15.8V)		
Grounding Method	.....	Negative ground		
Current				
Transmit (max.)	.....	K,E,M2,M3 : 13A or less	M4 : 8A or less	
Receive (at 2W output)	.....	1.0A or less		
Frequency Stability (-20°C~+60°C)	.....	Within ±2.5ppm		
Dimensions (W x H x D projections not included)	.....	160 x 43 x 137 mm / 6-5/16 x 1-11/16 x 5-13/32 inch		
Weight	.....	Approx. 1.2kg / 2.6lb		

### RECEIVER

Circuitry	.....	Double conversion superheterodyne
Intermediate Frequency (1st / 2nd)	.....	49.95MHz / 450kHz
Sensitivity (12dB SINAD)	.....	Wide : 0.18µV or less      Narrow : 0.22µV or less
Selectivity		
-6dB	.....	Wide : 12kHz or more      Narrow : 10kHz or more
-60dB	.....	Wide : 30kHz or less      Narrow : 24kHz or less
Squelch Sensitivity	.....	0.1µV or less
Audio Output (8Ω, 5% distortion)	.....	2W or higher (5% distortion)
Audio Output Impedance	.....	8Ω

### TRANSMITTER

Power Output		
High	.....	K,E,M2,M3 : 60W      M4 : 25W
Low	.....	K,E,M2,M3 : Approx. 25W
Modulation	.....	Reactance modulation
Spurious Emissions	.....	-60dB or less
Maximum Frequency Deviation	.....	Wide : ±5kHz      Narrow : ±2.5kHz
Audio Distortion (at 60% modulation)	.....	3% or less
Microphone Impedance	.....	600Ω

**Note : All specifications (General, Transmitter and Receiver) are guaranteed within the amateur radio band.**

Guarantee	K,M2,M3,M4	E
frequency range	144~148MHz	144~146MHz

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